Technical Report 457

METHODS OF EVALUATING TANK PLATOON BATTLE RUN PERFORMANCE

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SIMULATION SYSTEMS TECHNICAL AREA

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This report describes the development of methods for the assessment of tank platoon battle run performance. The aims of this first phase were to generate objective performance measures, to explore alternative data collection procedures, and to specify scoring and interpretation procedures. Performance measures were developed for 54 different performance constructs in the offensive battle run and 43 different performance constructs in the defensive battle run. Video taping of battle runs was explored as an alternative to traditional data collection procedures. The report concludes

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with a discussion of the procedures involved in using photomap board-gaming simulations to generate performance standards in terms of which to score and interpret platoon proficiency.

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Combat Performance Standards

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FOREWORD

One of the research efforts of the Simulation Systems Technical Area of the Army Research Institute for the Behavioral and Social Sciences (ARI) has been in the development of combat performance standards for evaluating the results of unit training. This report presents research on methods of evaluating tank platoon battle run performance, the final current qualifying test in armor gunnery training. It is the most recent part of a larger project of updating the tank gunnery qualification testing system, done for the Director of Training Developments, U.S. Army Armor School, Fort Knox, Ky. The work was done under Contract MDA903-C-2031 with the American Institutes for Research, under Army Project 2Q163743A780 (FY 79, Training Development for Battlefield Effectiveness), and through the cooperative efforts of personnel from ARI, the American Institutes for Research, Human Resources Research Organization, and the Armor School.

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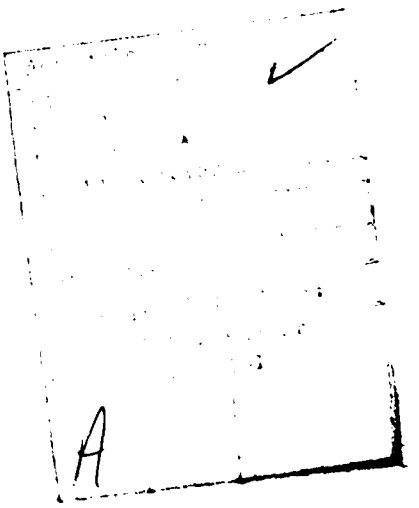

METHODS OF EVALUATING PLATOON BATTLE RUN PERFORMANCE

BRIEF

Requirement:

To develop improved techniques for evaluating tank platoon battle run performance, the final test in current armor crew training. Objectives were to define nonsubjective performance measures for tank sections and platoons, to develop and test potential data collection procedures, and to specify procedures for analyzing, interpreting, and establishing standards for platoon performance measures.

Procedure:

Descriptions of several different battle runs were reviewed for (1) content (test environment, tactical situation, scope of operation); (2) types of gunnery exercises in the battle run; (3) the evaluation system used, including evaluation purposes, aspects of performance addressed, and scoring procedures. This review provided a perspective for conducting mission analyses and deriving performance constructs and measures.

A candidate set of objective measures was derived in three stages. First, a mission failure analysis pinpointed possible reasons for a platoon's failure to accomplish its mission, to focus attention on platoon activities directly related to success or failure. Second, a conventional front-end mission analysis concentrated on platoon activities identified during the background review. Finally, the platoon tasks and activities identified were translated into performance constructs and measures. Existing constructs and measures were adapted to the battle run context whenever possible.

The feasibility of videotaping platoon battle runs was explored as an alternative to traditional methods for collecting evaluative data. Videotapes of offensive battle runs were made at Fort Carson, Co. and Fort Knox, Ky.

Finally, the feasibility of using a photomap board-game simulation of battle runs to generate platoon gunnery standards was explored. Two techniques were studied, one involving single players and the other using a Delphi mode of play.

Findings:

The review showed clearly that gunnery Tables I-VIII focused on marksmanship but the latest battle runs (Table IX) focus on tactics. This distinction is crucial in evaluating performance. Battle run performance measures have largely been ambiguous or so abstract that evaluations have been subjective.

The mission analyses enabled identification of 54 different performance constructs for which performance measures would be desirable in the offensive battle run and 43 in the defensive battle run; 38 of these were common to both. Candidate performance measures were developed, as far as possible, for maximum quantifiability and objectivity.

Videotaping of platoon performance during a battle run proved to be a feasible data collection alternative under proper conditions (qualified trained camera oeprators, adequate visibility). Trained evaluators will still be needed.

The board-game simulation provided promising results, with interesting individual differences in the single-player mode and readily achieved consensus in the Delphi mode. These techniques demonstrated good potential for generating performance, standards adapted to specific areas.

Utilization of Findings:

These analyses present a systematic exploration of what constructs should be measured and what measurement techniques might be used. Scores can be aggregated to determine qualification or to diagnose deficiencies. The cost-efficient implementation procedures suggested should improve the evaluation of tank platoons.

METHODS OF EVALUATING TANK PLATOON BATTLE RUN PERFORMANCE

TABLE OF CONTENTS

Section		Page
I	INTRODUCTION	1
	Statement of the Problem	3
II	BACKGROUND	5
	Content of Battle Runs	5
	Platoon Gunnery Exercises	12
	The Performance Evaluation System	16
	Conclusions	23
III	CONSTRUCTS AND MEASURES	25
	Inverted Mission Analysis	25
	Front End Analysis	29
	Specification of Constructs and Measures	31
IV	COLLECTION OF PERFORMANCE DATA	65
	Battle Run Implementation	65
	Data Collection	66
V	INTERPRETATION OF PERFORMANCE DATA	71
	Specification of Standards	71
	Aggregation of Scores	73
VI	REFERENCES	85

Appendixes

A Scope of Battle Runs Defined by Component "Tasks"

B Frequency of Target Types in Offensive and Defensive Battle Run Target Arrays

C Measurement Constructs

D Performance Measures

E Offensive and Defensive Inverted Mission Analyses

F Offensive and Defensive Battle Run Task Analyses

G Map Play Exercise - Individual and Delphi Modes

LIST OF TABLES

Table No.		Page
1	Summary Data for Target Arrays in Offensive and Defensive Battle Runs	15
2	Measurement Constructs in the Offensive Battle Run by Phase and Component.	33
3	Measurement Constructs in the Defensive Battle Run by Phase and Component.	34
4	Sample Platoon Battle Run Offense (Day)	36
5	Sample Platoon Battle Run Defense (Night)	53
6	Aggregation of Offensive Performance Constructs within Facets of Platoon Performance.	76
7	Aggregation of Defensive Performance Constructs within Facets of Platoon Performance.	80

LIST OF FIGURES

Figure No.		Page
1	Basic company team offensive major mission operations.	10
2	Basic company team defensive major mission operations.	11

METHODS OF EVALUATING TANK PLATOON BATTLE RUN PERFORMANCE

I. INTRODUCTION

As described in current Army doctrine, training and evaluation of tank gunnery in armor units proceeds in three logically sequenced phases. The first focuses on training the individual armor crewman to perform a basic set of enabling tasks and concludes when he exhibits a satisfactory level of proficiency on the Tank Crew Gunnery Skills Test (FM 17-12, 1977). In the second phase the focus shifts to the training and evaluation of crews. Upon completion of their training crews are required to demonstrate their competence in tank gunnery/marksmanship by service firing Table VIII for record (Draft FM 17-12-2, Change 2, 1978; Wheaton, Fingerman, & Boycan, 1978). In the third phase the focus expands again, from the single crew to the coordinated actions of the two to five crews comprising the tank section/platoon. As the culmination to this third stage platoons are required to demonstrate a prescribed level of proficiency on Table IX, the platoon battle run.

The platoon battle run is a relatively new concept. Only seven years ago there was no Table IX (FM 17-12, 1972); gunnery training culminated in crew qualification on Table VIII. But with the publication of TC 17-12-5 (1975), battle runs (one for sections and one for the platoon) were recommended, primarily as follow-on training activities. They were to be conducted once individual crews had demonstrated their ability to shoot on Table VIII, and were specifically designed to support the training and evaluation missions of ARTEP's (17-35, *Tank Battalion and Combined Arms Task Force*, 1975; and 7-45, *Mechanized Infantry Battalion and Combined Arms Task Force*, 1975). More recent versions of Table IX (e.g., Draft FM 17-12-2, Change 2, 1978) are, as indicated above, administered primarily for the purpose of documenting platoon competence in small unit gunnery. Platoon qualification is the final hurdle, to be achieved before the platoon participates in follow-on training and evaluation activities with the company team.

The content of Table IX has evolved from recommendations of armor subject-matter experts. Realizing that comprehensive and exhaustive testing of platoon gunnery skills in all tactical situations is impossible because of resource constraints, the designers of Table IX have attempted to distill the essence of platoon gunnery into a manageable set

of exercises.[1] Toward this end, a relatively small number of tactical scenarios have been developed that portray both offensive and defensive platoon missions. In turn, each mission consists of major mission operations or phases or tasks, many of which have also been identified in formal descriptions of tank platoon and company team operations (e.g., Warnick, O'Brien, Kraemer, Healy & Campbell, 1974a, b; Bessemer, 1979).

Richness of content is further enhanced by providing for a relatively large number of gunnery engagements. These represent mission-related tactical situations in which the platoon (and each section) engages specified mixes of enemy targets representing threat arrays likely to be encountered on the battlefield. In the aggregate the situations represent a challenging, small-unit firing course in which the tactical application of gunnery skills, developed in earlier tables, is combined with tactical maneuver and decision making. Quick target hits on multiple targets, teamwork in getting those hits, the ability of the unit to shift, distribute, and control its fires, tactical movement, and maneuvering to take advantage of the terrain are all emphasized.

Platoons fire Table IX a number of times, initially using dry-fire and subcaliber techniques to practice their gunnery skills (including REALTRAIN as advocated in TC 17-12-5, 1975). Eventually they fire the battle run for qualification, using service ammunition. Evaluation of a platoon's performance on these occasions is based on a variety of measures and scoring procedures depending upon the particular version of Table IX under consideration. The measures themselves range from those that are reasonably objective and reliable (e.g., the number of holes in a target, the number of unexpended main gun rounds) to those that appear highly subjective (e.g., judgment of effective control of fire, judgment of proper technique of movement). The scoring procedures include some that award points for certain levels of proficiency as well as others that assess performance of each task or exercise on a GO/NO GO basis.

The performance data collected during the battle run are used to make decisions about training deficiencies, as

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[1] The term *exercise* as used in this report refers to a grouping of one or more logically-related tasks. For example, there are preparation-of-fire-plan and movement exercises. When used in the gunnery context the term applies to target arrays rather than to individual targets.

well as qualification. In the first case the intent is to pinpoint those areas of performance in which platoon strengths and weaknesses lie. Specific deficiencies that are uncovered are then singled out for remedial training. In the second case a decision is made about the platoon's overall level of competence. Qualified platoons presumably possess the types and levels of proficiency which enable them to participate in and contribute to tactical missions undertaken by the company team or battalion.

STATEMENT OF THE PROBLEM

Given the overwhelming importance of effective platoon gunnery to success on the battlefield, ways must be explored of improving the evaluation of tank platoon gunnery performance. Toward this end, the U.S. Army Research Institute is supporting a program of research having three broad objectives. The first is to define more objective measures of section/platoon gunnery performance. The second is to develop and test alternative data collection procedures. The third is to specify methods for analyzing and interpreting Table IX test results. Achievement of these objectives is important because of a number of problems and deficiencies in the battle runs that are currently available.

The first problem is one of content. What should be included under the *rubric--"tank platoon gunnery?"* In developing battle runs the intent has obviously been to include a fairly wide variety of offensive and defensive exercises in which a number of platoon gunnery skills are to be demonstrated. However, the relevance and comprehensiveness of the exercises/skills that comprise Table IX are unknown. This is because explicit rationales have not been used to include (and exclude) specific kinds of content. As a consequence, analyses are needed of the specific team activities and skills that underlie platoon performance in different mission scenarios.

Assuming that sections and platoons are required to demonstrate proficiency on a meaningful set of exercises/skills, a second major problem arises--objective measures of performance are required. At present, *number of target hits*, and *elapsed engagement time* are the only two truly objective measures of performance obtained. Other critical skills such as *control of movement*, *use of terrain*, and *distribution of fire* are evaluated subjectively. Accordingly, analyses are needed that specify objective measures for the activities/skills selected for evaluation during a battle run. At issue is the accuracy, reliability, and validity with which estimates of section/platoon proficiency can be generated.

A third problem, related closely to the second, is the lack of procedures for collecting objective, quantitative performance data in the field. Insofar as possible, subjective estimates need to be replaced by more objective data. When subjective data must be used, anchored-rating scales, multiple observers, video/audio recordings, etc., should be considered as ways of improving measurement reliability. These approaches must be tailored to the specific skills and measures upon which evaluation of platoon performance is to rest.

A fourth problem is that procedures for processing and interpreting obtained performance data are at a rudimentary level of development. Several different scoring approaches are conceivable, and a number of these have actually been used. But the relationships between the resulting scores and a platoon's training deficiencies or assumed success in combat are not well understood and need to be explored.

A final issue is how to accomplish Table IX objectives effectively and yet cope with the inordinate expense of running tanks and expending live main gun ammunition. The answer to the question probably lies in supplementing and in some cases substituting subcaliber for main gun firing. The limitations and advantages of doing so need to be analyzed. Also, use of live rounds must be limited to training only those skilled performance where live rounds are absolutely essential to skill acquisition/maintenance/measurement. This is particularly true because of the recent evolution of engagement simulation (SCOPES, REALTRAIN, MILES) which may eventually play a role in the total tank gunnery qualification system.

The remainder of this report summarizes a year's research on the problems listed above. In the next section, the history of the evolution of the battle run, from 1975 to the present time, is presented. The presentation is intended to provide the reader with a better understanding of and appreciation for the task analyses that were conducted. Three subsequent sections describe the development of candidate sets of measures for use in offensive and defensive battle runs, and discuss implementation of battle runs, data collection systems, and approaches to interpretation of performance data.

II. BACKGROUND

Descriptions of tank platoon battle runs and associated gunnery techniques are available in numerous publications (e.g., TC 17-12-5, 1975; FM 17-12, 1977; FM 17-12-2, 1977; FM 17-12-4, 1977; FM 71-1, 1977; Draft FM 17-12-1, February and May, 1978; Draft FM 17-12, Change 2, 1978; Draft FM 17-12-2, Change 2, 1978; and Draft ARTEP 71-2, Chapter 8, Appendix 29T, 1978). These descriptions were reviewed in an attempt to identify a number of issues bearing on ways of improving the evaluation of tank platoon gunnery performance, and to resolve those issues explicitly.

The review is organized into three general topics. The first concerns the content of battle runs and includes the test environment, the nature of the larger tactical situation within which battle runs presumably occur, and the scope of the missions/operations/tasks that are portrayed. The second topic deals with the types of gunnery exercises that comprise Table IX and make it distinct from Table VIII. The third and most critical topic concerns the performance evaluation system itself and addresses the purposes of evaluation, the aspects of performance to be assessed, and the procedures for scoring platoons.

CONTENT OF BATTLE RUNS

Agreement on a number of assumptions is necessary in order to define the domain of platoon behaviors for which performance measures are to be generated. Put simply, we must agree on what it is we want to measure before measures, data collection procedures, and scoring approaches can be considered meaningfully.

The test environment. In the earliest versions of Table IX (TC 17-12-5, 1975) a scenario was employed in which the platoon (and sections) maneuvered across terrain toward an objective, engaging a variety of targets along the way. Although the test setting was clearly tactical in nature, evaluation of performance was primarily focused on gunnery.

Current Table IX's (Draft FM 17-12-2, Change 2, 1978; Draft ARTEP 71-2, 1978) focus on platoon tactical performance. The goal of the test is to require the platoon to incorporate tactical decision making and maneuver with gunnery in coordinated response to a one-sided, controlled OPFOR (assumed or simulated) tactical scenario. This type of highly realistic and tactically oriented battle run, both in concept and in manner of implementation, makes evaluation of performance an extremely difficult enterprise.

The tactical nature of current battle runs produces a test in which many different kinds of platoon performance contribute to the test score. Proficiency, as reflected in any given performance measure, may vary because of actions taken (or not taken) by any one of the individual tank commanders, the platoon sergeant, or the platoon leader.[1] Similarly, proficiency is likely to represent the resultant of several different kinds of skills or behaviors (e.g., distribution of fire, selection of overwatch position, issuance of appropriate platoon fire commands). As a consequence, because of the multidimensional nature of platoon performance, it may be difficult in any particular exercise to unravel the specific training deficiencies that lead to a missed target, or to ineffective control of fire, etc.

In order to deal with this complexity, an alternative approach to evaluating tactics would be one in which individual aspects of platoon performance were evaluated separately. For example, exercises (either within a single test or across a series of tests) would establish competence in such areas as the ability of the tank commander to prioritize targets, the ability of the platoon to employ patterns of fire, etc. Once competence in these enabling tasks had been demonstrated, the platoon could bring them all to bear during the course of a full-fledged battle run. This type of approach has been used, in fact, to develop a test of tank crew marksmanship in lieu of an evaluation of "gunnery" as conducted in the Crew Combat Qualification Course (Wheaton, Fingerman, & Boycan, 1978).

Current approaches to the *implementation* of battle runs also make evaluation of performance difficult. A flexible and dynamic test environment is recommended within which to evaluate the platoon's tactics. For example, indirect fire support may be called upon, *at the discretion* of the platoon leader. Smoke screens may be laid down if and when there is an advantage in doing so. Maximum use of all available terrain is encouraged. In addition, to insure scenarios that are "new" and continually challenging, test controllers are urged to vary target positions and combinations, to change avenues of approach by reconfiguring such features as simulated mine fields, and to choose new assembly areas and start points. Finally, tactical realism is served by uniquely

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[1] The actions of individual crew members may also have an impact on platoon performance. To the extent that they are relevant they will manifest themselves in the behavior of individual tanks (e.g., tank A-2 did not fire from defilade--because its driver did not analyze the terrain properly).

adapting the range design and layout of Table IX to the specific terrain available at each test site.

Thus, in both concept and implementation, battle runs have evolved into complex test environments in which different kinds of behavior interact with the different external characteristics of terrain, weather, etc. to influence platoon performance. The emphasis is on the evaluation of different platoon tactical skills that are tacitly assumed to transcend the specifics of the firing course on which the platoon is tested. The development of objective performance measures must take this environment into consideration rather than the more structured and simplistic settings that might be conceived.

The tactical situation. In most of the battle runs developed to date the platoon exercises are usually viewed as being *embedded* in a larger company team, battalion, or task force operation. This larger tactical context was not evident in the earliest battle run (TC 17-12-5, 1975). Platoons simply engaged targets while moving toward an "objective." Soon thereafter, however, in FM 17-12 (1977) the enemy situation was described in general terms, the platoon leader was informed of the presence of another friendly platoon on his flank, and he was told of the availability of supporting mortar and artillery fires should he have need for them. In the latest battle runs (Draft FM 17-12-2, Change 2, 1978; Draft ARTEP 71-2, 1978) the tank platoon is clearly operating within a company team tactical context. In fact, in the latter document the platoon is provided with scout elements which it is to use and is required to communicate extensively with the company team commander.

The larger tactical perspective reflected in the most recent battle runs is entirely consistent with doctrine concerning the role(s) of the tank platoon in a tank and mechanized infantry company team operation (FM 71-1, 1977). The point is important for it establishes that the latest battle runs are fundamentally different from the earliest Table IX's. They do not simply address distribution and control of fire (as is currently practiced and evaluated on subcaliber Table V-P), but also require the platoon to accomplish specific missions. This fact provides a rationale for evaluating platoon performance not only in terms of tactical enabling skills (e.g., distribution of fire, use of terrain) but also in terms of mission outcomes (e.g., whether the objective is seized, casualties inflicted/sustained, etc.). In fact, it may be possible to specify mission-related outcome measures (e.g., ammunition or fuel remaining) that characterize the platoon's ability to continue to function on the battlefield, as one component of a company-team engaged in a larger and unfolding mission.

Scope of missions. Most of the references recommend that at least two battle runs be practiced by the platoon--one based on an offensive mission scenario, the other on a defensive mission scenario. The original section and platoon battle runs described in TC 17-12-5 (1975) are based solely on an offensive concept; moreover, they do not represent formal mission scenarios in the sense that later Table IX's do.

In FM 17-12 (1977) two scenarios are presented, one based on an offensive, movement-to-contact and hasty attack mission, the other on a defend-battle-position, delaying action mission. The suggestion is also made that the two runs be practiced under different conditions of illumination--the offensive run during the day and the defensive run at night. Ammunition is allocated for service firing of *either* the offensive *or* the defensive Table IX as the qualification run. Similar missions are prescribed in the supplements to FM 17-12 (1977). The only notable deviation is in Draft FM 17-12-1 (May, 1978) in which *both* the offensive and defensive runs are conducted for qualification of XM1 platoons.

Recent changes in FM 17-12 (i.e., Draft FM 17-12, Change 2, 1978; Draft FM 17-12-2, Change 2, 1978) continue to prescribe the same general types of mission, but a third scenario has been added--defensive mission during daylight. Qualification involves service firing of any one of the three. The Draft ARTEP (ARTEP 71-2, 1978) prescribes the live firing of two battle runs representing the same types of missions described above. The night defensive mission is used together with either the daylight attack or the daylight defensive scenario.

Considered collectively, the battle run scenarios in use during the past four years encompass a rather limited set of missions. For example, other analyses (Warnick, O'Brien, Kraemer, Healy, & Campbell, 1974a) have identified five general kinds of missions derived from an overall statement of the TOE armor company mission--"to close with and destroy enemy forces, using fire, maneuver, and shock effect (p. 5)." Of these five general missions (i.e., reconnaissance, security, retrograde, offensive, and defensive), only the latter two have been used to structure battle runs. In other words, Table IX's are designed to focus on a relatively circumscribed domain of armor platoon performance, and are thus limited in scope.

The restriction in scope is even more apparent when the operations comprising the offensive and defensive missions are considered. Other analyses have parsed the general missions into component major functional areas termed major mission operations (Warnick, O'Brien, Kraemer, Healy, & Campbell, 1974a;

Bessemer & Kraemer, 1979). Schemas depicting the major operations performed by the company team, and by extension the platoon, are presented in Figures 1 and 2 for offensive and defensive missions. Of the nine offensive mission operations shown in Figure 1, five are represented in various battle runs (e.g., those connected by heavier lines). Three of these are core operations that are found in most offensive Table IX's (i.e., "Conduct Movement to Contact", "Take Action on Contact," and "Conduct Hasty Attack"). The most recent Table IX's also make some provision for two others: "Plan Offensive Operation" and "Consolidate After an Attack." Of the nine defensive operations shown in Figure 2, most battle runs provide for evaluation of performance in three: "Occupy Assigned Sector/Battle Position," "Defend Battle Position," and "Displace to Alternate Battle Position[1]." To a very limited extent one current defensive Table IX also provides for evaluation of the platoon's ability to "Plan the Defensive Operation," as well as to "Reorganize After the Defense."

At an even more detailed level of analysis it is conceptually possible to decompose the relevant mission operations into constituent duties, tasks, or subtasks (Warnick, O'Brien, Kraemer, Healy, & Campbell, 1974b; O'Brien, Kraemer, & Haggard, 1975). These specific entities presumably represent the actual procedures or actions that a platoon must accomplish in order to carry out major mission operations, thereby completing the mission. Platoon battle run tasks, therefore, define the scope of Table IX's in terms of the specific kinds of performance to be evaluated.

All of the battle runs were scrutinized to determine their precise scope of coverage at the "task" level. The review was conducted not only to establish which component activities were pinpointed for evaluation but also to determine what kinds of descriptive terminology were used. The specific terms used, the battle runs to which they apply, and the relationships among them are described in Appendix A.

This analysis revealed the extent to which descriptions of content have become more detailed and specific as battle runs have evolved. For example, the content of an earlier offensive battle run (FM 17-12, 1977) was decomposed into five *phases*. In a later version (Draft FM 17-12-2, Change 2, 1978) the same general content was described in terms of

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[1]The term "supplemental" should probably be used instead of "alternate." The distinction is between displacing from the primary to a supplemental *battle position* and moving between primary and alternate *firing positions* within a battle position.

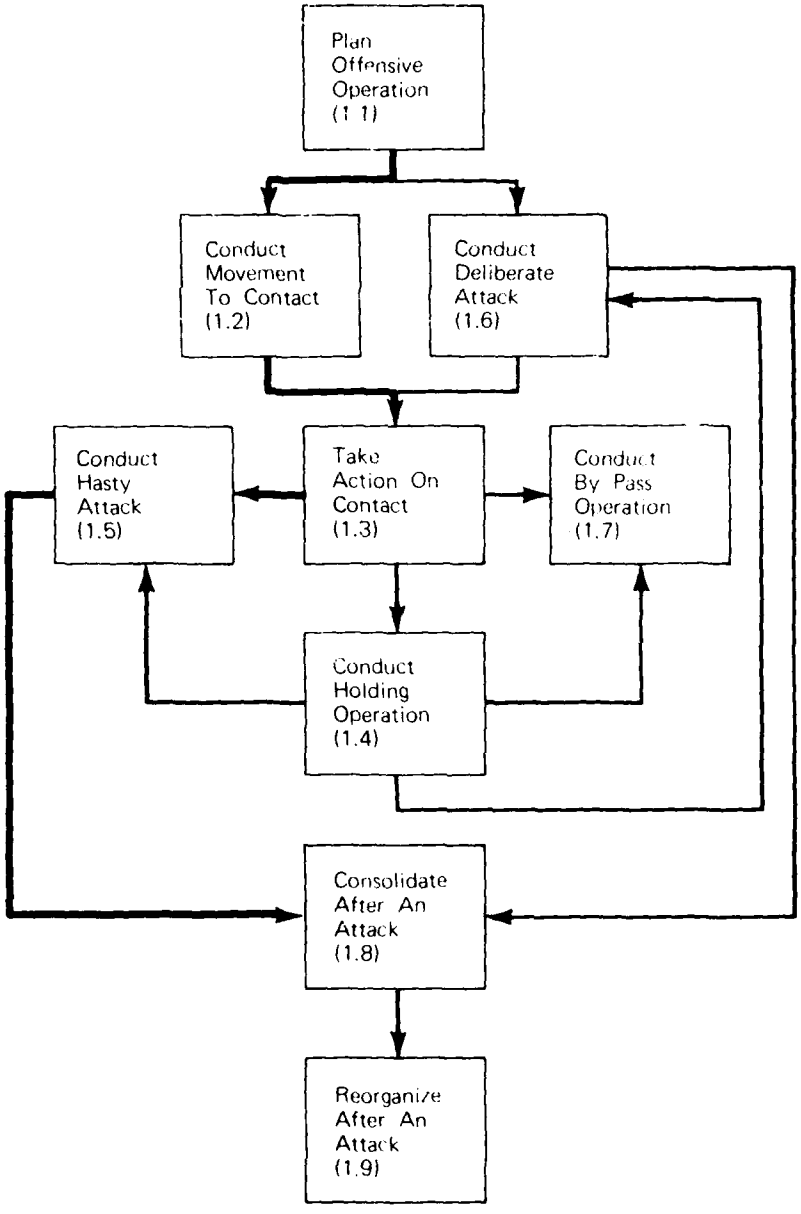

Figure 1. Basic company/team offensive major mission operations. (After Bessemer and Kramer, 1979)

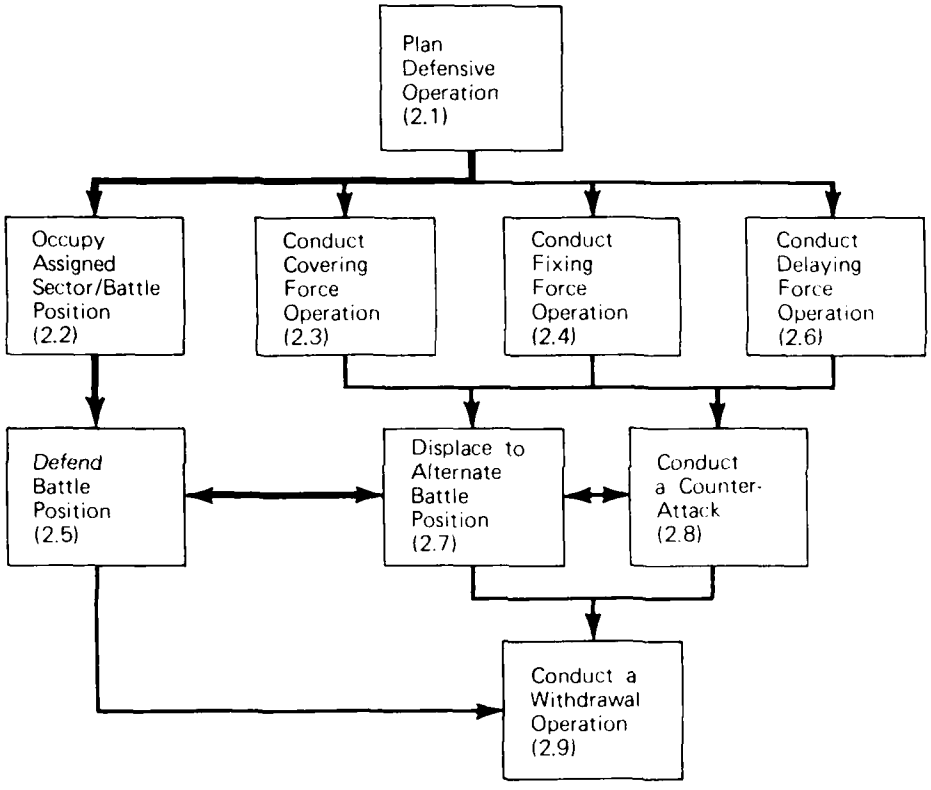

Figure 2. Basic company/team defensive major mission operations. (After Bessemer and Kramer, 1979)

10 fairly specific *tasks*. This change in level of description is important since it implies that an evaluation of performance must correspondingly become more detailed and broader in scope.

Summary. Although the domain of platoon performance is extremely broad in character, its *evaluation* has been limited in scope, as defined by the content of the offensive and defensive battle runs that have been developed to date. Only selected missions and major mission operations have been used as contexts within which to evaluate platoon performance, and these have remained more or less the same in successive versions of Table IX.

While the basic substrate of Table IX has remained the same, two changes in emphasis have occurred that have major implications for the aspects of platoon performance that are to be evaluated. As originally conceived, Table IX was a test of platoon gunnery; as such it was the natural sequel to the Table VIII crew evaluation. To enhance platoons' acceptance of the battle run its realism was increased by embedding it within the context of a "tactical mission." In the past four years, however, emphasis has shifted to evaluating a platoon's conduct of the tactical mission per se, of which gunnery is but one component or enabling skill. In light of this change, the focus of the current project was expanded in an attempt to provide for the evaluation of other aspects of platoon tactical performance, in addition to gunnery.

The second change in emphasis was the level of detail with which the battle run missions were articulated. Not only were scenarios developed that involved performance in addition to gunnery, but these other aspects were described in terms of fairly detailed tasks and activities. As a consequence of this gradual change, the most recent offensive-day and defensive-night battle runs (i.e., Draft FM 17-12-2, Change 2, 1978) are the most inclusive in terms of content. Because these are the most comprehensive to date, they were adopted as the model battle runs upon which to base the definition of performance constructs and measures.

PLATOON GUNNERY EXERCISES

At the very heart of the offensive and defensive battle runs lie the various gunnery exercises that the platoon must perform. These were also reviewed in order to develop potentially relevant measures, especially those reflecting kinds of gunnery performance not evaluated during Table VIII crew qualification. The review considered the kinds of targets that are presented within given arrays as well as the

numbers of targets and arrays. Detailed results of the review are presented in Appendix B.

Characteristics of targets and arrays. As indicated in Appendix B, many types of threat targets are used in the different offensive battle runs. These include main gun targets (e.g., tanks, antitank weapons, ATG's, BMP's and BRDM's), coax targets (e.g., ATGM's, troops), and .50 caliber targets (e.g., trucks and helicopters). In addition, situations are included which require the delivery of self-screening direct fire and area suppressive machinegun fire. This diversity is particularly evident in the two most recent battle runs.

Two other trends are also evident. In keeping with the view that U.S. forces may have to fight outnumbered, even when on the offensive, most of the battle runs represent the threat in multi-target arrays. In TC 17-12-5 (1975) multiple targets are depicted but there are relatively few targets in any array.[1] A shift then occurs in the supplements to FM 17-12 (1977) that may be noted in all subsequent battle runs; most of the target arrays involve two or more targets. The second trend is in the composition of these multi-target arrays. Most of the supplements to FM 17-12 (1977) depict arrays containing targets belonging to the same class (e.g., four HIND, or three tanks, etc.). While using some of these arrays, the two most recent offensive battle runs also use arrays containing highly realistic mixes of targets (e.g., one BRDM and one ATGM team; four tanks, three ATGM teams, and dismounted troops, etc.). These arrays reflect the current emphasis on realistic portrayal of the threat which will require platoons/sections/crews to prioritize and engage multiple targets in order of danger.

Diversity of targets and target arrays also characterizes the defensive battle runs. Each array involves some form of multiple targets. As described in the supplements to FM 17-12 (1977) the platoon in the defense primarily encounters sets of combinations of BMP's, tanks, ATGM's and troops. Again, in the two latest battle runs more diversity is evident in the attacking threat force (e.g., one threat motorized rifle company consisting of eight BMP's, four tanks, and troops and a second threat company comprised of six BMP's, two tanks, and troops). Arrays such as these should place a premium on target prioritization and distribution and control of platoon fire.

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[1] The scenarios depict multiple-target arrays but the scoring forms are based on single target engagements.

Numbers of targets and arrays. Table 1 summarizes information about numbers of targets and target arrays in the offensive and defensive battle runs. Two features of this table are particularly salient. The first and perhaps the most striking is the large number of engagements (targets) involved in these Table IX's. While in the defense the platoon engages targets reflecting odds that range from 5:1 to more than 11:1! The way in which the defensive scenario is implemented partially explains how such a large number of targets come to be presented. The basic attacking force is portrayed repeatedly in waves at closer and closer ranges. Each wave presumably contains large numbers of targets reflecting the onslaught of OPFOR's attack. Another aspect of the explanation is that the threat forces are projected to vastly outnumber our own, and these force ratios are realistically presented in the battle runs.

Large numbers of engagements also characterize the offensive Table IX's. But these are spread over three or four segments of the mission (e.g., movement to contact, hasty attack, assault, etc.), a fact which tends to dilute them. The only significant concentration of threat targets typically is found in the assault stage of the attack. Even here the concentration is reasonably small.[1]

The second important feature of Table 1 is the number of arrays in which targets appear. In all of the battle runs, whether offensive or defensive, relatively few arrays are used, resulting in a relatively large target/array ratio. The extent to which this ratio increases as the more recent Table IX's are considered is an index of the emphasis being put on multiple target engagements and the related distribution and control of fire skills. The 31 offensive main gun and machinegun targets recommended in Draft FM 17-12-2, Change 2 (1978) appear in a total of seven arrays. Draft ARTEP 71-2 (1978) calls for 38 targets in eight arrays. In the defensive missions recommended for these same two Table IX's, target-to-array ratios of 51/2 and 57/2 are prescribed, respectively.

In summary the gunnery exercises appear to offer ample opportunities to evaluate platoon gunnery per se. Multiple target arrays are presented that represent different mixes of threat. Other engagement conditions such as target range,

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[1] In keeping with doctrine, larger threat forces would compel the platoon to break off the action or by-pass the position.

Table 1. SUMMARY DATA FOR TARGET ARRAYS IN OFFENSIVE AND DEFENSIVE BATTLE RUNS

	SOURCES									
	FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
OFFENSIVE BATTLE RUNS	*		**					***		
# of total targets / # of total target arrays		9								
# of main gun targets / # of main gun target arrays					22					
# of machinegun targets / # of machinegun target arrays										
DEFENSIVE BATTLE RUNS	*	****						***	*****	*****
# of total targets / # of total target arrays										
# of main gun targets / # of main gun target arrays										
# of machinegun targets / # of machinegun target arrays										

*The FM does not present tables for the platoon, although it does contain a chapter on platoon distribution and control of fire.

**Specific target arrays are described in FM 17-12-2 (3/77).

***Specific target arrays are described in FM 17-12-2, Change 2, DRAFT (8/78).

****The TC does not present a defensive battle run.

*****Battle runs are presented for both day and night in the manual. Only information from the night battle run is presented here.

and type of illumination are realistically varied. The *implementation* of such exercises, however, appears fraught with difficulties, especially in the offensive missions.

As one reads through the scenarios (for example, the offensive battle run in 17-12, 1977) one is greatly impressed with the dynamic realism of Table IX. For example, while the light section is bounding it is fired upon by a threat tank platoon; the overwatching heavy section returns their fire while the light section maneuvers; etc. Such descriptions, provided on a fanciful or post hoc basis, belie the difficulty of *controlling the battle run to insure that this specific type of exercise occurs*, and recurs when the battle run is administered to other platoons. For the purpose of identifying objective measures of platoon performance it is assumed that the types of gunnery exercises portrayed in Draft FM 17-12-2, Change 2 (1978) and in Draft ARTEP 71-2, Chapter 8, Appendix 29T (1978) can in fact be implemented.

THE PERFORMANCE EVALUATION SYSTEM

As described so far, armor platoons conduct offensive and defensive missions during battle runs that occur within the context of a larger tactical operation. While participating in Table IX the platoon undertakes a number of major mission operations that consist of *component* activities and tasks. During these operations the platoon moves, shoots, and communicates in a hostile environment containing complex arrays of threat targets.

The purpose of this large-scale and expensive staging is to provide a training and evaluation setting within which to obtain measures of platoon performance. As the final step in the review of battle runs, therefore, the underlying performance evaluation system was examined. Specifically, attention focused on: the purposes for which estimates of platoon proficiency are needed; the kinds of performance constructs and performance measures that are used; and the procedures recommended for assigning scores and applying standards of performance.

Purposes of performance measurement. Platoon performance is evaluated for two reasons as previously mentioned. The first is to diagnose deficiencies in platoon performance. Ideally, the remediation of these weaknesses will be the focal point of subsequent platoon training which continues until the next evaluation takes place. The section and platoon battle runs first proposed in TC 17-12-5 (1975) were expressly designed for this purpose as indicated by the

"standards" given for performance. For example, the platoon/section should be able to:

1. engage multiple targets in priority of danger to the platoon/section with the appropriate weapon,

2. meet crew time of engagement standards for the type tank shooting,

3. engage targets and conserve ammunition by accurate distribution of fires,

4. shift section fires in 10 seconds to suppress an area target, and

5. employ suppressive fire and maneuver, using terrain to maximum advantage to destroy multiple targets in any tactical situation.

In fact, these statements are not performance standards (with the exception of #2, and possibly #4); rather they are general specifications of training objectives whose accomplishment by the platoon is to be assessed periodically. Testing the platoons will determine whether they can: 1) prioritize targets, 2) shoot fast, 3) distribute fires, 4) shift fires, and 5) employ suppressive fire and maneuver. Performance evaluation for this purpose is an implicit aspect of all Table IX's. It is intended to give the unit commander diagnostic information about different dimensions of platoon performance. He is told not only whether a platoon is qualified, but also, in the event it is not, what the underlying causes probably are. How well Table IX's support the diagnosis of deficiencies will be addressed below when the measures themselves are considered.

The second reason for evaluating platoon performance is to establish the platoon's level of qualification or competence with respect to certain kinds of operations/tasks/behaviors presumably required in combat or in supporting a higher unit in its mission(s). Beginning with the battle run described in FM 17-12 (1977) virtually all Table IX's coming after TC 17-12-5 (1975) support qualification of platoons. Nevertheless, the Army does not yet have a formal, Army-wide awards system for recognizing platoon gunnery qualification.

The procedures used to determine platoon qualification are still evolving. For example, as is evident in Appendixes A and B, the content of Table IX, on which the qualification

judgment is based, is continually being modified. As will be discussed shortly, the measures of performance have also undergone change. Some of the references urge the local commander to select the specific Table IX (day or night, offensive or defensive) to be used for the service firing qualification run. Similarly, different categories of qualification are recognized (e.g., "Distinguished", "Qualified", "Unqualified", or "Qualified/Unqualified"). Some Table IX's use point-scoring systems while others use criterion-referenced approaches.

In summary, evaluation of platoon performance is undertaken to determine qualification and to diagnose deficiencies in performance. These dual purposes should drive the development of relevant performance constructs and measures.

Performance constructs and measures. Each platoon battle run is designed and conducted to permit evaluation of certain aspects of tank platoon performance but not others. At a rather gross level of description the mission(s), major mission operations, and tasks comprising a battle run serve to define a delimited domain of performance which is of interest. But in order to develop performance measures that are objective and sharply focused, a much more detailed level of description is required. Toward this end specific measurement constructs or concepts must be used to label and functionally describe those aspects of performance singled out for evaluation. They indicate what it is that is to be evaluated or measured and in Table IX might include such notions as distribution of platoon fire or use of terrain. Collectively, these constructs define a performance model which dictates the testing rationale and stimulates the development of performance measures (Flanagan 1951; Mirabella, 1977).

The performance measures represent operationalized versions of the abstract measurement constructs and are the empirical referents for the constructs. They indicate how measurement is to be accomplished and constitute the means by which a platoon's proficiency with respect to a given construct can be inferred and characterized. For example, measures for the constructs cited above might include: number of tanks firing at each target, number of targets in each array not engaged; rate of travel (kph) across open terrain, percentage of hull exposed to an (enemy) observer, etc.

Without further preamble, the battle runs were reviewed to determine what models, measurement constructs, and measures have been promulgated in the past. This portion of the overall review was deemed especially important to the task of increasing the objectivity of measures.

None of the documents addressing platoon battle runs formally and explicitly describes a model of platoon gunnery performance. Furthermore, there is little or no documentation of the ways in which implied models of platoon gunnery performance have been used to develop the test rationale or the testing environment. As a result the linkages (rationales) between constructs and measures are weak or nonexistent. Similarly, the "chicken" (test stimuli) and "egg" (test response) problem cannot be put into perspective.[1]

Measurement constructs referred to in the various battle runs (either in the text of the source documents or in the Table IX descriptions) are listed in Appendix C. Overall, some 152 separate measurement constructs are listed that differ with respect to the general type of performance involved and/or in the level of specificity achieved. It was possible to categorize 136 of these under eight general kinds of higher-order platoon performance including:

- Preparation and Planning--Offensive Mission
- Preparation and Planning--Defensive Mission
- Techniques of Movement
- Use of Terrain
- Fire and Maneuver
- Distribution of Platoon Fires
- Engagement of Multiple Targets, and
- Use of Proper Reporting Techniques.

The earlier battle runs (i.e., TC 17-12-5, the 1977 FM 17-12, FM 17-12-2, and FM 17-12-4 series) involve roughly 50 different constructs, of which more than half lie within the

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[1]For example, it is unclear whether designers of Table IX's first develop the exercises and then look for applicable measurement constructs or whether they start with the constructs and design the test exercises to elicit the kinds of performance that are of interest. In most cases a combination of the two approaches has probably been used. Exactly which approach has been used is an important piece of information since it bears on the relevance and comprehensiveness of the constructs and measures that are enumerated. An evaluation of the relevance and comprehensiveness of constructs and measures found in various battle runs is beyond the scope of the present research. The working assumption is that the exercises and constructs comprising the battle runs under review (particularly those in Draft FM 17-12-2, Change 2, 1978) can be used to define a relevant and reasonably comprehensive set of performance measures.

category representing engagement of multiple targets. Other kinds of performance, including mission planning, fire and maneuver, and reporting are rarely if ever represented in these first efforts. In the later battle runs (Draft FM 17-12-2, Change 2; Draft ARTEP 71-2) a change in emphasis is apparent. Although fewer constructs are found in these battle runs (e g., 35 to 40 in the various offensive and defensive missions) more of the eight major performance categories listed above tend to be represented. (Notable exceptions are the lack of emphasis on reporting techniques in Draft FM 17-12-2, Change 2, and on distribution of platoon fire in Draft ARTEP 71-2[1].) Correspondingly, these most recent Table IX's place less emphasis on constructs within the engagement-of-multiple-targets category--particularly those dealing with technique of machinegun fire. Such performance is after all associated with the actions and gunnery skills of an individual crew rather than the section(s) or platoon.

In virtually all of the major areas of performance the subordinate constructs are stated too vaguely and at too general a level to provide for the derivation of useful performance measures. Specifically, although the measurement constructs defining the actual test content of Table IX's are usually alluded to, they are seldom explicitly stated or clearly articulated. This fact can have several potential consequences including the following: the recommended performance measures, like the constructs which they represent, may be highly subjective; because the constructs are sometimes compound in nature the measures may involve more than one measurement operation and thus be "impure"; occasionally because the constructs are so vague they may simply not be measured. The cataloging of performance measures was undertaken with these possible pitfalls in mind.

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[1]Performance in this latter Table IX is evaluated with respect to the satisfactory accomplishment of specified tasks carried out under particular conditions. As an example, the platoon must neutralize at least 21 out of 30 threat tank targets in an array within a specified amount of time. It is assumed that in order to attain or exceed this level of performance the platoon must be able to distribute its fires. But measurement constructs explicitly dealing with distribution of fire have been omitted, making diagnostic evaluation in this area difficult if not impossible. This is a serious matter since the major purpose of this ARTEP Table IX is *not* to determine whether the platoon gets a "GO" on a particular gunnery exercise but rather to uncover training deficiencies (in such areas as distribution of platoon fires).

Performance measures explicitly or implicitly used in the various battle runs are listed in Appendix D. The 107 measures that were identified have been grouped into categories reflecting the eight general measurement constructs previously mentioned. In spite of the relatively large number of measures, relatively few are actually used to characterize performance in a given battle run. For example, in TC 17-12-5 (1975) 21 measures are used, half of which focus on gunnery skills involved in the engagement of multiple targets. In the 1977 gunnery manual and supplements, 18 and 13 measures are used in the offensive and defensive battle runs respectively. In each of these sets over half of the measures address engagement of multiple targets. In the latest battle runs more measures are used (i.e., 25 and 28 in the offensive and defensive runs described in Draft FM 17-12-2, Change 2, 1978; 19 and 37 in Draft ARTEP 71-2, 1978) but, as shown in Appendix D, relatively fewer of these concentrate on aspects of gunnery per se.[1]

The evolution in measures reflects the changing nature of the constructs underlying the battle runs. For example, the measures used in the earlier battle runs do not represent all eight of the major areas of performance. In the latest battle runs the measures are more widely and evenly distributed across the various metaconstructs (with the possible exceptions of distribution of fire and fire and maneuver).

The most important aspect of Appendix D, however, is the highly subjective nature of the measures. In most cases the measures simply represent restatements of measurement constructs (e.g., platoon moves from attack position *deployed*). As such there is seldom an indication of how measurement is to be accomplished or upon which specific attributes or variables the measurement is to be predicated. Obvious exceptions to this rule are measures relating to the speed and accuracy of engagements, for example, in which elapsed time and target hits are ascertained. Generally, however, the constructs are at best not explicitly specified. At worst they are unknown.

The tendency to confuse constructs with measures and to offer measures that are not tied to observable attributes or variables is fostered in the later battle runs by the format used to describe the exercises. Starting with FM 17-12-1 (1978) the platoon is expected to perform a series of tasks, under specified conditions, to prescribed standards.

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[1]The number of measures reported for both defensive battle runs is inflated because in each case day and night scenarios were combined to arrive at a total figure.

Typically, the task statement itself is rather amorphous, but is usually broken down into several more specific measurement constructs that are listed under the task *standards*. One of dozens of examples that could be cited is the seventh task in the offensive battle run of Draft FM 17-12-2, Change 2 (1978). The platoon is to "continue the attack and react to the threat" (the task statement); the threat consists of "three BMP's at 1100-1400m" (the conditions statement). In performing this task under the conditions given, the platoon is required to satisfy five standards: 1) hit/kill BMP's within 40 seconds; 2) employ fire and maneuver; and obtain satisfactory subjective evaluations on 3) control of fire, 4) report procedures, and 5) movement technique and use of terrain. But, with the exception of the first one, these standards really list the constructs believed to be involved in performance of the task. In many instances, although enumerated under the standards column, the constructs are identified as subtasks and appear in the form ..." the platoon will ...." Such subtask statements, although clearly not performance measures, are prevalent in the list of "measures" comprising Appendix D.

The entries in Appendixes C and D represent the many different kinds of performance that have been considered for evaluation within the context of Table IX. Many of the constructs and measures associated with the earlier battle runs actually reflect the performance of individual crews or even crewmen, particularly in gunnery. These have not been included in the later Table IX's nor will they be emphasized in the present effort. The balance of the constructs and measures, while conceivably relevant and useful as a point of departure, are basically unacceptable. They do not represent the detailed and objective performance measures that are required.

Scoring procedures. A criterion-referenced scoring approach has replaced the point-scoring systems used in earlier battle runs (TC 17-12-5, 1975; FM 17-12, 1977). This rather dramatic shift has come about for two reasons. First, it was virtually impossible to determine what component exercises or tasks the platoon could perform competently, given an aggregate point score representing performance on several exercises. In fact, a platoon might fail completely on one or more tasks and yet still receive a "passing" total score (see Wheaton, Fingerman, & Boycan, 1978 for a more detailed discussion of this problem). Second, the point-scoring approach did not provide for diagnosis of specific deficiencies contributing to substandard performance. The training value of the battle runs was diminished because of this limitation.

The criterion-referenced scoring approach used in the later battle runs is consistent with the task/conditions/ standards characterization of Table IX exercises. In order to qualify, a platoon must demonstrate its competence by receiving a "GO" on some percentage of the exercises comprising either the offensive or defensive battle run. Whether a "GO" is received or not is dependent upon satisfactory accomplishment of the one or more standards specified for each task or exercise. Accordingly, in this scoring system most emphasis is placed on successful completion of the task as indicated by outcome measures of performance. For example, the platoon must hit/kill 70% or more of the targets in an array within a 40- or 60-second interval.

To complement an assessment of the outcomes of performance, the latest battle runs also provide for an evaluation of more process-oriented, enabling kinds of performance that are high in diagnostic value. These measures are then used to identify areas in which the platoon is weak, essentially independent of the outcomes on a particular task. For example, in the offensive exercise cited above, the platoon must exhibit satisfactory control of fire, fire and maneuver, etc. in addition to meeting the hit/kill standard. The challenge is to make both kinds of measures more objective.

CONCLUSIONS

Several battle runs have been reviewed at length from different perspectives in order to provide a framework within which to specify objective measures of platoon performance. In essence, the framework represents a set of explicit assumptions about the missions, mission operations and tasks to be portrayed in battle runs and about the types of behavior to be addressed by the evaluation system.

The composition of battle runs has changed radically during the past four years. Both offensive and defensive scenarios are now used to portray selected kinds of major mission operations. These operations are in turn elaborated into more detailed activities or tasks. To the extent that only one subset of all the possible missions and operations is used in their portrayal, the battle runs might be viewed as being restricted in scope. But this view is illusory, for the battle runs represent extremely complex test environments in which a wide range of platoon performance can be evaluated.

As the battle runs have evolved there has been a change in emphasis from platoon gunnery to platoon tactics. This shift is evident in the design of Table IX's as well as in

the way they are conducted. Performance on any task or the outcome of any engagement may be a function of the crew, the platoon sergeant, the platoon leader, or of the platoon in its entirety. The underlying components of performance are multi-dimensional, involving not only gunnery but also tactical decision making and maneuver. In keeping with this tactical emphasis the battle runs are embedded within a larger operational context and are conducted in a highly flexible manner to enhance realism.

The most significant finding emerging from the review is that today's battle runs represent a substantially different kind of evaluation than is attempted in the preceding eight gunnery tables. The performance domain is much broader and includes many areas of performance that are simply not addressed in these prior and prerequisite training and evaluation exercises. The original Table IX's, that stressed tank gunnery and movement skills, have evolved into much more comprehensive scenarios where the target behaviors involve not only gunnery and movement but also mission preparation and planning, use of supporting forces, after-operation reorganization, etc. The target behaviors, however, are typically not specified in the detailed, clearly articulated manner that is necessary. Accordingly, there is unnecessary ambiguity with respect to the specific constructs of platoon performance that are being evaluated. Similarly, performance measures are specified in the abstract, leading to evaluations which may often be unnecessarily subjective.

To address this problem the current effort must necessarily deal with platoon gunnery in the highly tactical setting within which it now exists. Therefore, the specification of performance measures will be undertaken within the specific context of the missions, major mission operations, and tasks comprising the offensive day and defensive night battle runs described in Draft FM 17-12-2, Change 2 (1978). Choice of a particular battle run is necessary to keep the effort within manageable bounds. The one that has been selected is highly representative of those that will probably be used for the next several years.

III. CONSTRUCTS AND MEASURES

The compilation of a candidate set of constructs and objective measures to support evaluation of tank platoon battle run performance was accomplished in three stages. In the first, a mission failure (or inverted mission) analysis was carried out. Its purpose was to pinpoint those aspects of platoon performance that could logically be implicated as potential reasons for a platoon's failure to accomplish its mission. In essence, by working backward from assumed failures on selected mission outcome criteria, this analysis attempted to focus attention (and subsequent evaluation) on that subset of platoon activities directly related to successful or unsuccessful mission outcomes. In the second stage a more conventional, front end, mission task analysis was conducted to portray the activities in which an armor platoon engages while conducting specific types of operations. This analysis was anticipated to be more inclusive than the inverted mission analysis. To keep it focused on aspects of performance of relevance during battle runs, platoon activities involving the eight meta-constructs identified during the background review were emphasized. In the third stage the platoon tasks and activities identified in the mission analyses were translated into performance constructs and measures. Toward this end the attempt was made, insofar as possible, to make use of existing constructs and measures by refining or otherwise adapting them to the platoon battle run context.

INVERTED MISSION ANALYSIS

The inverted mission analysis attempted to capitalize on the idea that it might be easier to specify the causes of unsatisfactory mission outcomes than it would be to state unambiguously the behaviors that are required to assure mission success. By working backward from hypothesized unsuccessful outcomes, it might be possible to derive a hierarchically organized set of activities. Each activity would be referenced to unsuccessful mission performance by being causally linked to a failure to adequately perform the activity that immediately precedes it in the hierarchy. In essence, the method would generate for each performance failure a list of possible causes. Each cause in turn would become a performance failure for which other possible causes would be generated. The analysis would continue in this fashion until the causes of failure at the platoon level were exhausted.

Method. Two inverted mission analyses were performed in an attempt to identify tank platoon performance measures--an analysis of an offensive mission and an analysis of a defensive mission. Both missions were modeled after the Table IX exercises described in Draft FM 17-12-2, Change 2, 1978.

The first step in performing each of these analyses was to specify overall outcome standards for mission success. The particular standards that were specified were judged to be reasonable given the mission statements. For the offensive battle run, the standards specified were: (1) to secure the objective within one hour of crossing the LD; (2) to secure the objective with a minimum of three operational tanks with full crews; and (3) to be able to continue the attack within 30 minutes of securing the objective. The standards for the defensive battle run were: (1) to be able to maintain the defensive position for a specified time; and (2) to move to a subsequent battle position, when the order is given, with a minimum of three operational tanks with full crews.

Once the standards were specified, the assumption was made for the purpose of conducting the analysis that the platoon failed to meet these standards during the battle run. First-order causes served as the initial outcomes from which the hierarchical chain of causal linkages began. For the offensive battle run, these first-order causes of mission failure or combat failure criteria were: (1) insufficient remaining ammunition to complete or continue mission; (2) too few surviving tanks; (3) securing the objective too late; and (4) too few enemy destroyed. For the defensive battle run the combat failure criteria were: (1) too few surviving tanks; (2) insufficient remaining ammunication to complete or continue mission; (3) disengaging too early; and (4) enemy force too large.

The combat failure criteria listed above represent the suggestions made by armor experts concerning the criteria with which tank platoons could be evaluated. Not all of these criteria would necessarily be relevant for all missions. Depending upon the mission itself and the conditions under which it would be performed, some or all of these criteria would be applicable. However, for a specific mission, the experts disagreed among themselves regarding the importance of each criterion. Nevertheless, for the purpose of the analyses, it was assumed that all of the combat failure criteria were relevant.

Since each combat failure criterion was the outcome representing a first-order cause of failure within the

hierarchy, the next step was to generate the outcomes that could have caused each of the failures. For example, in the offensive battle run, lists of outcomes were prepared specifying the performances that could have led to insufficient ammunition, too few surviving tanks, an objective that was secured too late, and/or too few enemy destroyed. For example, the second-order causes for too few surviving tanks were (1) self-inflicted losses, (2) mechanical losses, (3) enemy inflicted losses, (4) terrain losses, and (5) tanks being lost en route.

Once the second-order causes of failure were generated, the next step was to generate third-order causes. This was accomplished by specifying the third-order outcomes that could have led to each second-order failure. For example, enemy inflicted losses could have been due to (1) being hit by an enemy round or (2) hitting a minefield. Once the third-order causes of failure were specified, fourth-order causes were generated. Thus, being hit by an enemy round could have been caused by (1) failure to detect the enemy, (2) failure to destroy the enemy, (3) failure to reduce vulnerability, and (4) failure to evade missiles. The analysis was then continued by generating fifth- and lower-order causes until the outcome was the result of a crew or individual action rather than a platoon action.

Because the concept of IMA was novel, a flexible approach was used in performing it. A group approach was tried at first. Three persons familiar with armor exercises attempted to work together to generate the causal linkages. However, it was observed that the task was not conducive to a group effort. The fact that different persons with the group concentrated on different portions of the analysis made it difficult to maintain cohesive interaction. Therefore, each of the participants was assigned one or two of the combat failure criteria and worked alone on that portion of the analysis.

Once the analyses were finished, the next step was to identify omissions. This was done by examining descriptions of critical incidents reported by veterans of armored combat (Boldovici, Kraemer, Reeves, & Healy, 1975). Causes of unit failure identified in the critical incidents were compared with those generated in the inverted mission analyses. Causes that had been omitted from the analyses but that appeared relevant for the platoon battle run were inserted as appropriate.

Once the revisions were completed, each analysis was examined in a group situation by the team of analysts. The

focus was on the adequacy of the causal linkages. Attempts were made to identify outcomes that were omitted from the analysis or to identify outcomes that were not in the proper causal sequence. Following these reviews, corrections were made as necessary.

Results. The results of the two inverted mission analyses are contained in Appendix E. The various nodes in each branching diagram provide opportunities for measurement of platoon performance, the level of measurement proceeding from fairly general to rather detailed behaviors. Considering the "failures" associated with the offensive mission, two features of the results are clear. The number of nodes identified as potentially contributing to mission failure is large, including some 286 options arrayed across the four mission failure criteria (i.e., insufficient ammunition, too few survivors, too late, too few enemy destroyed). Fortunately, however, many of these nodes are redundant with others, a finding suggesting the possibility of defining a subset of measures which is of a manageable size.

The redundance is even more apparent when results of the defensive mission analysis are considered. In this case it is possible to identify whole branches of failures that were uncovered in the earlier, offensive analysis.

In spite of the promising nature of these results, the decision was made not to base the development of performance constructs and measures exclusively on them. They exhibited three shortcomings which argued for the use of other complementary approaches as well. First, the results did not represent the relatively small subset of relevant performance constructs that had been hoped for. Even with the considerable redundancy which existed, there was a formidable number of constructs with which to deal. Second, the nodes in the analyses had intentionally been construed as successively finer outcomes (e.g., tank fires out of sector) rather than as processes (e.g., platoon distribution of fire). The outcomes frequently resisted analyst attempts to induce culprit processes, activities, or tasks that would more readily permit the derivation of constructs and measures. Third, the results did not differentiate among components of the platoon that might be responsible for failure on a particular combat criterion. Differentiations, although potentially valuable, were not made between the Platoon Leader, Section Leaders, sections, and platoon.

To address these shortcomings front end mission task analyses were also undertaken. These results were in effect merged with those from the inverted mission analyses to derive performance constructs and measures.

FRONT END ANALYSIS

Mission-oriented task analyses were conducted for the same two battle run scenarios that had been examined in the inverted mission analysis. The offensive scenario, based on a movement-to-contact and hasty attack/assault mission, begins with the Company Team Commander's issuance of an OPORD in an assembly area and terminates when the platoon secures an objective. It takes place during daylight. The defensive scenario, patterned after a conduct-relief-in-place, defend, and delay mission, starts with occupation of a battle position and ends with the movement to and defense of a supplemental battle position. It is conducted at night.

Method. The framework for the analyses was initially based on a detailed inventory of armor platoon tasks developed in earlier research (Warnick, O'Brien, Kraemer, Healy, & Campbell, 1974a, b). While the inventory was extensive, many of the tasks and subtasks contained within it were related to major mission operations other than those comprising the target battle runs (e.g., attack from march column, conduct screening operation, etc.) Nevertheless, there was enough overlap between the major mission operations in the inventory and in the battle runs to provide a solid point of departure.

Staff familiar with armor operations and with current Army documentation in the area performed the analyses. In both scenarios the mission was decomposed into reasonably self-contained phases prior to more detailed examination. The offensive mission phases consisted of Preparation and Planning, Movement to Contact, Assault, and Consolidation and Reorganization. Five phases were represented in the defense including Preparation and Traveling, Occupation of Battle Position, Defense of Battle Position, Movement to Supplemental Battle Position, and Defense of Supplemental Battle Position.

Within each of these mission phases the analysts attempted to balance two concerns. First, they tried to identify and include tasks that, while not actually performed in the prototype battle runs (e.g., Conduct Tactical Road March), did help to define and structure the mission context. Such tasks were not converted into constructs or measures in subsequent stages although the Army might choose to do so in the future, were the domain of platoon performance examined in Table IX to be expanded still further. Second, the analysts attempted to keep the domain within reasonable bounds. Thus, they attempted to define a platoon domain of performance that represented more than

"platoon gunnery" but far less than the range of tasks contained in either the Warnick et al. inventory or the many platoon missions evaluated in ARTEPs.

Toward this end the analysts elaborated the missions phase by phase. Within a phase they concentrated on those meta-constructs that appeared to represent the gist of battle runs that have been offered to date. While the decisions were necessarily arbitrary, the general rule of thumb was to include rather than exclude tasks or subtasks. Preliminary descriptions of each phase were reviewed with other staff to identify omissions of content as well as to eliminate content judged to lie outside the domain of performance implied by the two scenarios. Revisions were then undertaken as necessary.

Results. The outcomes of the offensive and defensive battle run task analyses are presented in Appendix F. Each mission has been analyzed into its constituent phases (e.g., PREPARATION AND PLANNING), tasks (e.g., DEPART ASSEMBLY AREA), and subtasks (e.g., Platoon Leader sets up overwatch and bounding sections). In developing this progressively more detailed description, the analyses were essentially terminated whenever activities within a particular task were encountered that represented actions of individual crewmen within separate tanks. As a consequence the analyses deal with those team behaviors or skills that involve: the platoon as a whole; the sections, addressed as heavy and light or overwatching and bounding; the Platoon Leader; and the section leaders (i.e., Platoon Leader for the heavy section and platoon sergeant for the light section). The emphasis in these analyses, of course, is on enabling activities and processes rather than on the causally-linked outcomes described in the analogous inverted mission analyses.

In considering the details of the task analyses (Appendix F) some key features are of interest. First, many of the subtasks identified within the offensive and defensive missions represent unique events. They occur but once during the course of a battle run mission (e.g., the set of subtasks comprising the Platoon Leader's troop leading procedures during the PREPARATION AND PLANNING phase). Nevertheless, their potential impact on subsequent mission performance may be substantial. Second, there are many other subtasks (e.g., Designated section bounds) that presumably can occur several times. How many times they actually arise will certainly be constrained by the physical layout of different battle run facilities, and will depend on the responses of individual platoons. Third, as in the inverted mission analyses, there is a gratifying amount of redundancy in even the most detailed

descriptors. This is true not only within phases of missions but between phases and between missions as well.

Like the inverted mission analyses which preceded them, the front end task analyses were designed to make explicit the types of behavior which a platoon might exhibit under the general rubric of "battle run." This specification yielded a working definition of the domain of platoon battle run performance and provided the basis for subsequent generation of performance constructs and measures.

SPECIFICATION OF CONSTRUCTS AND MEASURES

Method. The specification of tank platoon performance constructs and measures involved three activities. First, results of the inverted mission analyses and the mission-oriented task analyses were compared. The purpose of this step was to evaluate the relevance of the task-analytically derived platoon activities. At issue was the extent to which poor performance on specific subtasks could be hypothetically linked to the kinds of outcomes associated with mission failures as listed independently in the inverted mission analyses. In general, this process substantiated the relevance of the task analysis results.[1] As mentioned earlier some tasks were not relevant although they had been included to provide a somewhat larger context within which to view battle run activities. These tasks were not addressed when specifying constructs and measures.

The second step involved the compilation of all constructs and measures associated with previous battle runs and recommended for use in companion settings such as company team REALTRAIN missions (USACDC Pam 71-1, 1973; Scott, Meliza, Hardy & Banks, 1979; Scott, Meliza, Hardy, Banks, & Word, 1978; Medlin, 1979; and CAC Memorandum, 1979). These lists were referred to repeatedly when deriving constructs and measures for the tasks and subtasks comprising the offensive and defensive battle runs.

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[1] Parenthetically, the task analyses, which were specifically focused on major areas of presumably relevant platoon performance (i.e., on the eight meta-constructs), were felt to be more inclusive than the results of the inverted mission analyses. It could be argued that tasks not initially identified in the front end analyses but implicated in the inverted analyses represented oversights. A strong case for their inclusion could always be made.

The third step was the actual specification of constructs and measures, an effort that was undertaken by the same analysts who had performed the mission-oriented task analyses. The translation of subtasks into constructs and measures proved to be reasonably straightforward because of the level of detail achieved in the task analyses. In providing the specification the analysts explicitly addressed the battle run content defined by the offensive day and defensive night missions in Draft FM 17-12-2, Change 2 (1978).

Results. The outcomes of the specification are represented in Tables 2 and 3 in terms of the constructs used to represent performance, and within each mission phase, the specific components to which the constructs apply. In the offensive battle run (Table 2) 54 different constructs were identified for which a specification of measures would be desirable. In the first or PLANNING AND PREPARATION phase these primarily represented activities undertaken by the platoon as a whole (P) and by the Platoon Leader (PL). During MOVEMENT TO CONTACT the focus shifted dramatically to the sections (OWS and BS) and the section leaders (SL). During the final two phases the emphasis was again on the platoon and Platoon Leader.

In the defensive battle run (Table 3) 43 different constructs were identified, 38 of which were also included in the offensive battle run. In the defense the constructs were primarily associated with the platoon and Platoon Leader. When movement to a supplemental position was undertaken the constructs involved sections and section leaders.

The detailed articulation of how the various performance constructs relate to the different unit components is presented in Tables 4 and 5 for the offensive and defensive scenarios, respectively. These tables show the linkages between battle run tasks, constructs, and measures based on the same type of format found in Draft FM 17-12-2, Change 2 (1978). The first column in both tables contains a listing of mission phases, tasks, and subtasks. In the second column the conditions are described under which performance would presumably occur. The constructs associated with a given subtask are listed in the third column. In the fourth column the measures used to operationalize each construct are presented. Performance standards are indicated in the fifth and final column. The information in these last two columns represents the crux of the measurement specification process.

The candidate performance measures described in Tables 4 and 5 have been developed, insofar as possible, to maximize their quantifiability and objectivity. These goals

TABLE 2. Measurement Constructs in the Offensive Battle Run by Phase and Component

	PREPARATION & PLANNING							MOVEMENT TO CONTACT							ASSAULT							CONSOLIDATION & REORGANIZATION						
	P*	OWS	BS	S	T	PL	SL	P	OWS	BS	S	T	PL	SL	P	OWS	BS	S	T	PL	SL	P	OWS	BS	S	T	PL	SL
Maintenance of Integrity	✓			✓						✓								✓										
Reduction of Vulnerability	✓							✓	✓	✓					✓													
Intraplatoon Communication	✓																					✓						
Preparation for Operation	✓																											
Use of Covered Routes	✓									✓					✓													
Use of Concealed Routes	✓									✓					✓													
Speed of Movement in Open Areas	✓									✓					✓													
Dispersion	✓									✓					✓													
Tactical Deployment	✓																											
Tactical Formation	✓														✓													
Visual Signalling	✓							✓																				
Command & Control of Forces					✓	✓							✓B							✓	✓							
Completeness of Warning Order					✓																							
Timeliness of Warning Order					✓																							
Planning of Operation					✓																							
Location of OPORD					✓																							
Timeliness of OPORD					✓																							
Completeness of OPORD					✓																							
Control of Movement					✓							✓	✓B								✓							
Target Acquisition								✓																				
Rate of Movement to New OW										✓																		
Reconnaissance by Fire										✓																		
Bounding Tanks Duck												✓																
Bounding Tanks Dodge												✓																
Bounding Tanks Zig & Zag												✓							✓									
Stabilized Gunnery										✓					✓													
Target Prioritization								✓		✓					✓													
Speed of Fire								✓		✓					✓													
Marking for Overwatch										✓																		
Suppression of Targets								✓		✓																		
Pattern of Fire								✓		✓					✓													
Distribution of Fire								✓		✓					✓													
Target Neutralization								✓		✓					✓													
Assignment of Sectors of Observation													✓OW							✓								
Assignment of Sectors of Fire													✓OW							✓								
Communication												✓	✓B✓OW							✓								
Unit Fire Command													✓B✓OW							✓								
Control of Suppressive Fire													✓OW															
Request for Indirect Fire													✓OW							✓								
Adjust Indirect Fire													✓OW							✓								
Effectiveness of OW Position												✓																
Designation of Next OW Position												✓																
Designation of a Covered Route												✓								✓								
Designation of a Concealed Route												✓								✓								
Spot Report												✓																
Sweep Objective															✓													
Skylining															✓													
Massing Fire Power															✓													
Rate of Assault															✓													
Closed Hatches															✓													
Situation Report																				✓								
Shift Indirect Fire																				✓								
Designation of Assault Position																				✓								
Redistribution of Ammunition																						✓						

* P = Platoon
OWS = Overwatch Section
BS = Bounding Section
S = Sections
T = Tanks
PL = Platoon Leader
SL = Section Leader

TABLE 3. Measurement Constructs in the Defensive Battle Run by Phase and Component

	PREPARATION & TRAVELING							OCCUPY BATTLE POSITION							DEFENSE OF BATTLE POSITION (AND SUPPLEMENTAL POSITION)							MOVEMENT TO SUPPLEMENTAL POSITION						
	P*	OWS	BS	S	T	PL	SL	P	OWS	BS	S	T	PL	SL	P	OWS	BS	S	T	PL	SL	P	OWS	BS	S	T	PL	SL
Maintenance of Integrity	✓			✓																				✓				
Reduction of Vulnerability	✓							✓			✓												✓					
Intraplatoon Communication	✓							✓					✓															
Preparation for Operation	✓							✓																				
Use of Covered Routes	✓																							✓				
Use of Concealed Routes	✓																							✓				
Speed of Movement in Open Areas	✓																							✓				
Dispersion	✓																							✓				
Visual Signalling					✓	✓																		•				
Command & Control of Forces					✓																							
Completeness of Warning Order					✓																							
Timeliness of Warning Order					✓																							
Planning of Operation					✓								✓															
Location of OPORD					✓																							
Timeliness of OPORD					✓																							
Completeness of OPORD					✓																							
Control of Movement					✓															✓							✓	•B
Target Acquisition															✓													
Rate of Movement to New OW																								✓				
Reconnaissance by Fire																								✓				
Efficiency of Preparation								✓																				
Use of IR Flicker															✓													
Target Prioritization															✓													
Speed of Fire															✓													
Pattern of Fire															✓													
Distribution of Fire															✓													
Target Neutralization															✓													
Assignment of Sectors of Observation																											•OW	
Assignment of Sectors of Fire																											•OW	
Communication																				✓								
Unit Fire Command																				✓							•OW	
Control of Suppressive Fire																				✓			✓					
Request for Indirect Fire																											•OW	
Adjust Indirect Fire																				✓							•OW	
Request Illumination																				✓							•OW	
Effectiveness of OW Position																				•								
Designation of Next OW Position																												
Designation of a Covered Route												✓																
Designation of a Concealed Route												•																
Spot Report																				•								
Closed Hatches in Response to Incoming Artillery															•													
Selection of Unrestricted Positions												•																
Selection of Covered & Concealed Positions												•																

*P = Platoon
OWS = Overwatch Section
BS = Bounding Section
S = Sections
T = Tanks
PL = Platoon Leader
SL = Section Leader

were not achieved in every case as indicated by the "subjective evaluation" label preceding some of the measures. In many cases, however, such measures may prove to be perfectly defensible and entirely adequate. Such an event is likely given the level of detail with which these measures, as opposed to some of those suggested in the past, have been specified. Indications of high inter-evaluator agreement would be the desideratum. In those cases where such agreement is unlikely or in fact cannot be obtained, revisions will have to be instituted which increase objectivity.

Tables 4 and 5 represent the major outcome of the first phase of research. They suggest what should be measured in offensive and defensive battle runs and how that measurement should be accomplished. Subsequent sections deal briefly with ways of implementing battle runs that have implications for which measures can be obtained, ways of collecting performance data in the field, and ways of specifying standards and interpreting observed levels of platoon performance.

Table 4

SAMPLE
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
PHASE I - PREPARATION & PLANNING				
1.0 CONDUCT TACTICAL ROAD MARCH (Refer to Appendix F. Subtasks are not evaluated in the offensive battle run.)	-	-	-	-
2.0 OCCUPY ASSEMBLY AREA (Refer to Appendix F. Several subtasks are not evaluated in the offensive battle run.)				
2.2 Platoon Established Local Area	Platoon has moved into an Assembly Area & is waiting for an order for the Attack by the Company/Team Commander (C/T CO). The order will be given in five min.	Platoon maintenance of integrity.	Subjective Evaluation - Five minutes before the C/T CO issues the Attack Order, are all vehicles & personnel assembled in one compact area for ease of control & supervision? No. of vehicles ___ No. of personnel ___	Five tanks & crews (20 personnel) are within close physical proximity of one another.
2.5 Platoon Practices Light, Noise, & Movement Discipline	See 2.2.	Reduction of platoon vulnerability	Subjective Evaluation - Number of times the platoon breaks light discipline ___ Subjective Evaluation - Number of times the platoon breaks movement discipline ___ Subjective Evaluation - Number of times the platoon breaks noise discipline ___	Zero Zero Zero
2.6 Platoon Maintains Listening Silence	See 2.2.	Reduction of platoon vulnerability	Number of non-radio check, radio transmissions initiated by the platoon while in the Assembly Area ___	Zero
3.0 PREPARE FOR & PLAN OPERATION (Refer to Appendix F. A few subtasks are not evaluated in the offensive battle run.)				
3.1 Troop Leading Procedures				
3.1.2 Platoon Leader Assembles Key Subordinates	The C/T CO gives the Platoon Leader an oral OPORD for a Movement to Contact & Hasty Attack Mission. The OPORD includes: 1. threat & friendly situation - light OPFOR resistance is anticipated. 2. concept - including instructions to move to contact, forward 3. start point, attack position, line of departure, phase lines, assault position 4. objective	Platoon leader command & control of forces	Time C/T CO OPORD is received _____ The number of key subordinates (these having been identified earlier) who are present for delivery of the Warning Order ____	No key subordinates absent

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
3.1.2 (continued)	5. mortar/artillery fires available 6. LD time to be announced but platoon ready to move in one hour			
3.1.3 Platoon Leader Issues Warning Order	See 3.1.2. Key subordinates are assembled.	Completeness of Warning Order	The Warning Order contains the following information: 1. Mission ___ ___ 2. Objective ___ ___ 3. LD Time (Ready to move in one hr.) ___ ___ 4. Time OPORD will be given ___ ___ 5. Location where OPORD given ___ ___ 6. Instructions to ready platoon ___ ___ (Y / N)	The Warning Order contains all six elements of information.
		Timeliness of Warning Order	Time C/T CO order is given: _____ Time Warning Order given: _____ Elapsed Time: _____	(To be determined by Delphi.)
3.1.4 Key Subordinates Disseminate Warning Order	See 3.1.3 Key subordinates have been given Warning Order. Ten minutes have elapsed.	Intraplatoon communication	One crewman from each tank is selected who was not present for delivery of the Warning Order but who must state the: Tanks 1 2 3 4 5 (Y N for each) 1. Mission 2. Objective 3. LD Time 4. Instructions	Randomly selected crewmen can state the four basic elements of the Warning Order.
3.1.7.2 Platoon Leader Conducts Local Recon.	See 3.1.4.	Planning of operation	Subjective Evaluation - Does platoon leader conduct an on-the-ground reconnaissance?	On-the-ground reconnaissance is conducted as far forward as possible.
3.1.7.3 Platoon Leader Conducts Map Recon.	See 3.1.4. Platoon Leader has a 1:50,000 scale map.	Planning of operation	Platoon Leader identifies tactically relevant features, including: (Y / N) 1. Objective 2. Key terrain (high ground) 3. Possible enemy positions 4. Obvious avenues of approach	(To be determined by Delphi at each battle run facility.)

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
3.1.7.4 Platoon Leader Identifies Control Measures	See 3.1.7.3.	Planning of operation	Platoon Leader identifies control measures on his map, including: Y N 1. Assembly Area ___ ___ 2. Start Point ___ ___ 3. Attack Position ___ ___ 4. Line of Departure ___ ___ 5. Phase Lines ___ ___ 6. Boundaries ___ ___ 7. Assault Position ___ ___ 8. Checkpoints ___ ___	Control measures are identified correctly.
3.1.8.1 Platoon Leader Plans Scheme of Maneuver	See 3.1.7.3.	Planning of operation	Platoon Leader indicates: Y N 1. Covered & concealed route(s) AA to SP ___ ___ 2. Covered & concealed route(s) SP to LD ___ ___ 3. Covered & concealed route(s) LD to AP ___ ___ 4. Covered & concealed route(s) AP to objective. ___ ___ 5. Overwatch positions LD to objective. ___ ___ 6. Obstacles ___ ___ 7. Bounds by a) OW position ___ ___ b) route to next OW position ___ ___ c) next OW position ___ ___	(To be determined by Delphi at each battle run facility.)
3.1.8.2 Platoon Leader Plans Fire Support	See 3.1.7.3.	Planning of operation	Platoon Leader requests preplanned: HE artillery fire at coordinates: ____ ____ ____ etc. Smoke artillery fire at coordinates: ____ ____ ____ etc. Number of HE missions ___ Number of smoke missions ___	(Preplanned artillery fire is determined by Delphi at each battle run facility.)
3.1.9 Platoon Leader Assembles Key Subordinates	The platoon is in an Assembly Area. The Platoon Leader has issued a Warning Order & planned the operation.	Platoon Leader command & control of forces.	The number of key subordinates (these having been identified earlier) who are present for delivery of the OPORD _____	No key subordinates absent
3.1.10 Platoon Leader Issues OPORD	See 3.1.9. Key subordinates are assembled.	Location of OPORD	Subjective Evaluation - Platoon Leader issues the OPORD at a location which gives a view of the terrain to be traversed. Y ___ N ___	location permits platoon key subordinates to compare OPORD to terrain.

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
3.1.10 (continued)		Timeliness of OPORD	Time OPORD is given _____	Time is the same as indicated in Warning Order
		Completeness of OPORD	OPORD contains information about:	

	Y	N
1. Friendly situation		
2. Enemy situation		
3. Mission		
4. Objective		
5. Execution		
a) role of each section		
b) scheme of maneuver		
c) fire support		
6. Command & signal		
a) key radio frequencies		
b) call signs		
c) phase lines		
d) check points		
e) chain of command		

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
3.1.11 Key Subordinates Disseminate OPORD	See 3.1.10. Key Subordinates have been given OPORD. Ten minutes have elapsed.	Intraplatoon communication	One crewman from each crew is selected who was not present for delivery of the OPORD but who must state the:	Randomly selected crewmen can state these seven aspects aspects of the OPORD.

	Tanks 1		2		3		4		5	
	Y	N	Y	N	Y	N	Y	N	Y	N
1. Mission										
2. Objective										
3. Scheme of Man.										
4. Fire support										
5. Key radio freq.										
6. Call signs										
7. Chain of command										

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
3.2 Platoon Leader/Sergeant Conducts Precombat Checks	See 3.1.4.	Preparation for operation	Checks reveal no uncorrected faults in:	No uncorrected faults.

	Tanks 1		2		3		4		5	
	N	F	N	F	N	F	N	F	N	F
1. Vehicles										
2. Fuel										
3. Heavy Weapons										
4. Light Weapons										
5. Ammo										
6. Local Radio										
7. Distant Radio										
8. Crews										

(N = NO FAULT, F = FAULT)
Time platoon is ready to move _____ Platoon is ready to move in one hr.

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
4.0 DEPART ASSEMBLY AREA (Refer to Appendix F. A few subtasks are not evaluated in the offensive battle run.)				
4.1 Platoon Moves Out of Assembly Area				
4.1.1 Platoon Uses Terrain	Platoon moves out from Assembly Area to SP, AP, & LD	Use of covered routes	Fields of direct fire from likely OPFOR positions are determined. The percentage of the platoon's route that is uncovered from OPFOR fields of fire is estimated.	(To be determined by Delphi at each battle run facility.)
		Use of concealed routes	Fields of observation from likely OPFOR positions are determined. The percentage of the platoon's route that is unconcealed from OPFOR fields of observation is estimated.	(To be determined by Delphi at each battle run facility.)
		Speed of movement in open areas	Fields of direct fire & observation from likely OPFOR positions are determined. The platoon's rate of movement through uncovered or unconcealed areas is determined.	(To be determined by Delphi at each battle run facility.)
4.3.2 Platoon Leader Controls Movement				
4.3.2.1 Platoon Leader Designates Route	See 4.3.1.	Planning of operation	See 3.1.8.1	See 3.1.8.1
4.3.2.1 Platoon Follows Route Designated by Platoon Leader	See 4.3.1.	Platoon Leader control of movement	Platoon routes from AA to SP, AP, & LD are compared to maneuver routes planned in 3.1.8.1	Planned routes are followed
			Time platoon crosses SP _____	SP crossed on schedule (optional)
4.3.2.5 Platoon Conducts Tactical Movement to Attack Position	See 4.3.1.	Dispersion	Distance between tanks in meters	No two tanks are closer together than 50 meters
		Section Leader's command & control of forces	At two minute intervals from the AA to the LD are the other tanks in each section visible from the Section Leader's tank?	(To be determined by Delphi at each battle run facility.)

	LS		HS	
	Y	N	Y	N
Time AA + 2 minutes	_	_	_	_
+ 2 minutes	_	_	_	_

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
4.1.2.6 Platoon Deploys at Attack Position	See 4.3.1.	Tactical deployment	Number of tanks that come to a halt at the Attack Position _____	Tanks deploy without stopping.
		Tactical formation	Subjective Evaluation - Tanks move from formation on-line, to frontal formation	(To be determined by Delphi at each battle run facility.)
4.1.2.7 Sections Maintain Integrity	See 4.3.1.	Sections' maintenance of integrity	Subjective Evaluation - Tanks in each section follow the section leader & do as he does.	Distance between sections is greater than between tanks within sections.
4.1.2.8 Platoon Leader Sets up OW&B Sections	See 4.3.1.	Platoon Leader command & control of forces	Light Section Leader is asked whether he is the initial OW __ or B _ section.	Designation agrees with scheme of maneuver (3.1.8.1)
			Time B section crosses LD _____	B section crosses LD on time
4.1.2.9 Platoon Leader & Platoon Sergeant Communicate	See 4.3.1.	Visual signalling	Subjective Evaluation - Tanks within sections communicate by hand & arm signals. Sections communicate by flag signals.	Visual signals are employed.
		Reduction of platoon vulnerability	Number of radio transmissions initiated by the platoon between the AA & the LD _____.	*Zero*
PHASE II - MOVEMENT TO CONTACT				
1.0 CONDUCT TACTICAL MOVEMENT 1.1 Platoon Moves in Sections Using Bounding Overwatch 1.1.1 Designated Section Overwatches	Contact with the OPFOR is *imminent*. The bounding section has crossed the LD. The other section is overwatching.	OW section leader assignment of sectors of observation	Each OW TC indicates left & right boundaries of his crew's area of responsibility as assigned by the section leader.	Assigned sectors of observation contain no gaps.
		OW section leader assignment of sectors of fire	OW section leader identifies likely OPFOR positions	(To be determined by Delphi at each battle run facility.)
			Each OW TC indicates left & right boundaries of his crew's area of responsibility for fire as assigned by the section leader	Assigned sectors of fire contain no gaps.
			Each OW TC indicates likely OPFOR positions within his sector of fire.	(To be determined by Delphi at each battle run facility.)
		Effectiveness of OW position	The range in meters to likely OPFOR positions.	OPFOR positions within range of OW section.

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.1.1 (continued)		Reduction of OW section vulnerability	Subjective Evaluation - OW vehicles are in covered, hull-defilade positions with respect to likely enemy positions: Y N Tank 1 ___ ___ Tank 2 ___ ___ (Tank 3 ___ ___)	All OW tanks are in covered, hull-defilade positions
1.1.2 Platoon Leader Controls Movement	See II.1.0.	Designation of next OW position	Platoon Leader indicates checkpoint to which the moving section is to bound. Y ___ N ___	The moving section is to bound toward a specific objective.
		Designation of a covered route	See I.3.1.8.1, 87 & I.4.3.1	See I.3.1.8.1 & I.4.3.1
		Designation of a concealed route	See I.3.1.8.1, 87, & I.4.3.1	See I.3.1.8.1 & I.4.3.1
		Platoon Leader control of movement	Does Platoon Leader order section to bound? Y ___ N ___	Each bound should be ordered by Platoon Leader
1.1.3 Designated Section (B) Bounds				
1.1.3.1 B Section Uses Terrain	See II.1.0.	B section use of covered routes	See I.4.3.1	See I.4.3.1
		B section use of concealed routes	See I.4.3.1	See I.4.3.1
		B section speed of movement in open areas	See I.4.3.1	See I.4.3.1
1.1.3.2 B Section Leader Controls Movement	See II.1.0.	B section leader control of movement	B section route in first bound is compared to planned route (See I.3.1.8.1.) See I.4.3.2.5 (Tanks visible)	Planned route is followed See I.4.3.2.5
		B section dispersion	See I.4.3.2.5	See I.4.3.2.5
		B section maintenance of integrity	See I.4.3.2.7	Tanks follow section leader's lead
		B section rate of movement to new OW	Time from LD to new OW _____ Distance from LD to new OW _____ Speed in m/min _____	(To be determined by Delphi at battle run facility.)

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRICTS	MEASURES	STANDARDS
1.1.4 B Section Overwatches	Contact with the OPFOR is imminent. The bounding section has reached the new OW. The other section is still in OW.	B (OW) Section Leader assignment of sectors of observation.	See II.1.1.1.	See II.1.1.1
		B (OW) Section Leader assignment of sectors of fire	See II.1.1.1.	See II.1.1.1
		Effectiveness of OW position	See II.1.1.1.	See II.1.1.1
		Reduction of B (OW) section vulnerability	See II.1.1.1.	See II.1.1.1
		Visual signalling	Does bounding section signal occupation of new OW position with flags? ____Y ____N	Flag signals are employed.
1.1.5 Platoon Leader Selects Next OW Position	See II.1.1.4.	Designation of next OW position	Subjective Evaluation - The choice of the next OW position will support movement beyond it to yet another OW position. ____Y ____N	(To be determined by Delphi at battle run facilities.)
			Subjective Evaluation - The choice of the next OW position will provide fields of observation & fire on likely enemy positions toward the objective. ____Y ____N	(To be determined by Delphi at battle run facilities.)
			Range between new OW position & next OW position _____.	Next OW position as well as likely OPFOR positions threatening the route to it must be within range from the new OX.
1.2.1 OW Section Leader Controls Direct Fire	See II.1.1.4.	OW section fire command	Does OW Section Leader issue section fire command? ____Y ____N	OW fire is controlled by OW Section Leader.
		OW Section Leader control of suppressive fire	Number of HEP rounds fired at likely OPFOR positions as moving section bounds _____	(To be determined by Delphi.)
			Number of smoke rounds fired to observe likely OPFOR positions as moving section bounds _____	(To be determined by Delphi.)
			Number of OPFOR likely positions suppressed by machinegun fire _____	(To be determined by Delphi.)
	C/T (1) orders OW Section Leader to shift suppression machinegun fire		Time to shift fire from one OPFOR position to another _____ sec.	Section shifts fire within 10" of C/T (1) order.
1.2.2 OW Section Leader Controls Indirect Fire	See II.1.1.4.	OW Section Leader request for indirect fire	Number of times OW Section Leader requests indirect suppressive fire _____	(To be determined by Delphi.)
			Number of times OW Section Leader requests indirect obscurational fire _____	(To be determined by Delphi.)

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASES, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.2.2 (continued)			Preplanned fires called: Time / Coordinates 1. 2. 3.	(To be determined by Delphi.)
		OW Section Leader adjusts indirect fire	TRP data given to adjust fire at coordinates (_____) Adj. 1. _____ 2. _____ 3. _____	Indirect fire falls on target within three adjustments
		OW Section Leader communication	Subjective Evaluation - OW Section Leader uses proper RTP & CEOI	Proper RTP & CEOI is used
1.2.3 B Section Employs Recon-by-Fire	See II.1.1.4	B section recon-by-fire	Number of likely threat positions along route that are suppressed with machinegun fire _____	(To be determined by Delphi at each battle run facility.)
1.2.6 B Section Reduces Diesel Plumes	See II.1.1.4	Reduction of B section vulnerability	Subjective Evaluation - diesel plumes observed during bound? Tank 1 ___Y ___N Tank 2 ___Y ___N (Tank 3 ___Y ___N)	No diesel plumes are observed.
2.0 PLATOON REACTS TO CONTACT	Platoon is moving to contact, forward employing bounding overwatch. 4 threat BMP's fire on platoon. Range 1000-1400m.			
2.1 Platoon Employs Fire & Maneuver				
2.1.1 Platoon Acquires Targets		Target Acquisition	OW Section Leader issues acquisition report to C/T CO including: 1. who is reporting _____ 2. target description (4 BMP) __Y __N 3. location _____ 4. target action _____ 5. observer action _____	Acquisition report is complete & accurate.
2.1.2 Bounding Section Maneuvers to Cover				
2.1.2.1 B Section Uses Terrain	See II.2.1	B section use of covered route	See I.4.3.1	See I.4.3.1
		B section use of concealed route	See I.4.3.1	See I.4.3.1
		B section speed of movement in open area	See I.4.3.1	See I.4.3.1
2.1.2.2 B Section Uses ATGM Counteraction Drill	See II.2.1	B tanks duck	Subjective Evaluation - tanks move quickly behind cover from BMP's	Tanks ducked
		B tanks dodge	Subjective Evaluation - tanks make 90° turn to possible missile line of flight	or dodged
		B tanks zig & zag	Subjective Evaluation - tanks move in violent zig-zag path to cover.	or zig-zagged

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
2.1.2.3 B Section Moves Rapidly to Closest Cover	See II.2.1.	Reduction of B section vulnerability	See II.1.1.1	See II.1.1.1
			Subjective Evaluation - hull defilade positions chosen were the nearest available ___Y ___N	Tanks occupy nearest covered positions
			Time in seconds after appearance of OPFOR to occupy hull defilade positions Tank 1 _____ Tank 2 _____ (Tank 3 _____)	(To be determined by *Delphi* at each battle run facility.)
		B section dispersion	See I.4.3.2.5	See I.4.3.2.5
		Section Leader command & control of forces	See I.4.3.2.5	See I.4.3.2.5
		B section maintenance of integrity	See I.4.3.2.7	See I.4.3.2.7
2.1.3 Bounding Section Engages on the Move	See II.2.1.	B section stabilized gunnery	Number of B tanks that come to a brief halt to fire _____	No tanks come to a brief halt.
		B section target prioritization	The sequence in which targets are engaged by the bounding section: Tanks: 1st Eng / 2nd Eng / 3rd Eng / 4th Eng / Closest Targ. 1 (MG,CX,.50) T#__ T#__ T#__ T#__ T#_____ 2 (MG,CX,.50) T#__ T#__ T#__ T#__ T#_____ 3 (MG,CX,.50) T#__ T#__ T#__ T#__ T#_____	Tanks engage the closest of the most dangerous targets first.
		B section speed of fire	The time in seconds for each tank to take a target under fire: Tank 1 _____ Tank 2 _____ (Tank 3 _____)	Fire first fast within five seconds.
		B section marking for overwatch	Subjective Evaluation - machinegun or WP fire is used to provide a TRP for the OW section	OW section acquires target(s)
		B section suppression of targets	Target 1 Suppressed/Hit ___Y ___N Target 2 Suppressed/Hit ___Y ___N Target 3 Suppressed/Hit ___Y ___N Target 4 Suppressed/Hit ___Y ___N	All four targets suppressed by bounding section.
2.1.4 Bounding Section Engages From Defilade	See II.2.1.			
2.1.4.1 B Section Leader Controls Direct Fire	See II.2.1.	B section fire command	Section Leader fire command specifies: Alert _____ Weapon/Ammo _____ (optional) Description _____ Location _____ Control _____ (optional) Execution _____	Fire command is accurate & complete.

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
2.1.4.1 (continued)		B section target prioritization	See II.2.1.3	See II.2.1.3
		B section pattern of fire	Analysis of data above shows that section used a: frontal pattern ___ cross pattern ___ depth pattern ___	The pattern of fire used was appropriate.
			Subjective Evaluation - The OPFOR location vs the B section called for a _____ pattern	
		B section distribution of fire	Fire was distributed by: Nearest half ___Y ___N As commanded ___Y ___N	
			Number of targets not engaged _____	Zero
			Number of targets engaged by more than one vehicle _____	Zero
		B Section Leader communication	Subjective Evaluation - use of RTP & CEOI	Proper RTP & CEOI is used.
2.1.4.2 B Section Neutralizes Targets	See II.2.1.	B section speed of fire	See II.2.1.3	See II.2.1.3
		B section target neutralization	Number of targets hit in 40 seconds _____	Three (Draft FM 17-12-2, Change 2)
2.1.5 OW Section Supports by Direct Fire				
2.1.5.1 OW Section Leader Controls Direct Fire	See II.2.1	OW section fire command	See II.2.1.4.1	See II.2.1.4.1
		OW section target prioritization	See II.2.1.3	See II.2.1.3
		OW section pattern of fire	See II.2.1.4.1	See II.2.1.4.1
		OW section distribution of fire	See II.2.1.4.1	See II.2.1.4.1
		OW Section Leader communication	See II.2.1.4.1	See II.2.1.4.1
2.1.5.2 OW Section Neutralizes Targets	See II.2.1.	OW section speed of fire	See II.2.1.3	See II.2.1.3
		OW section suppression of targets	See II.2.1.3	See II.2.1.3
		OW section target neutralization	See II.2.1.4.2	See II.2.1.4.2

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
2.1.6 OW Section Supports by Indirect Fire	See II.2.1.			
2.1.6.1 OW Section Leader Controls Indirect Fire	See II.2.1.	OW Section Leader request for indirect fire	See II.1.2.2	See II.1.2.2
		OW Section Leader adjusts indirect fire	See II.1.2.2	See II.1.2.2
		OW Section Leader communication	See II.1.2.2	See II.1.2.2
2.1.7 Platoon Leader Issues Spot Report		Spot report	Platoon Leader submits a spot report describing: 1. enemy situation 2. location of enemy 3. outcome of contact	Spot report is accurate & complete.
		Platoon Leader communication	See II.1.2.2	See II.1.2.2
PHASE II - MOVEMENT TO CONTACT				
2.0 . . . 2.1.7	Platoon is moving to contact, forward employing bounding overwatch. Bounding section encounters threat ATGM team 600-800m; threat BRDM 800-1000m.	II.2.0 . . . II.2.1.7	II.2.0 . . . II.2.1.7	II.2.0 . . . II.2.1.7 II.2.1.4.2 & II.2.1.5.2 (See Draft FM 17-12-2, Change 2)
PHASE II - MOVEMENT TO CONTACT				
2.0 . . . 2.1.7	Platoon is moving to contact, forward employing bounding overwatch. Platoon encounters three threat BMP's 1100-1500m	II.2.0 . . . II.2.1.7	II.2.0 . . . II.2.1.7	II.2.0 . . . II.2.1.7 II.2.1.4.2 & II.2.1.5.2 (See Draft FM 17-12-2, Change 2)
PHASE II - MOVEMENT TO CONTACT				
2.0 . . . 2.1.7	Platoon is moving to contact, forward employing bounding overwatch. Platoon encounters: a) 4 tanks 1800-2000m & 3 ATGM teams 800-1000m b) Dismounted troops 40m from tanks	II.2.0 . . . II.2.1.7	II.2.0 . . . II.2.1.7.	II.2.0 . . . II.2.1.7. II.2.1.4.2 & II.2.1.5.2 (See Draft FM 17-12-2, Change 2)

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRICTS	MEASURES	STANDARDS
PHASE II - MOVEMENT TO CONTACT				
2.0 . . . 2.1.7	Platoon is moving to contact, forward employing bounding overwatch. Platoon encounters: a) 2 threat moving tanks on obj. 1200-1600m b) 2 threat tanks hull-down on obj.	II.2.0 . . . II.2.1.7	II.2.0 . . . II.2.1.7.	II.2.0 . . . II.2.1.7. II.2.1.4.2 & II.2.1.5.2 (See Draft FM 17 12-2, Change 2)
PHASE III - ASSAULT				
1.0 DEPLAY AT ASSAULT POSITION				
1.1 Platoon Moves into Assault Position	Platoon has been moving to contact, forward employing bounding overwatch & reacting to the threat with fire & maneuver. The platoon is nearing the Assault Position.			
1.1.1 Platoon Leader Controls Movement				
1.1.1.1 Platoon Leader Designates Positions to Platoon		Designation of assault positions	Platoon Leader indicates positions to which the platoon is to move to launch the assault ___Y ___N	The tanks occupy specified positions at the Assault Position.
1.1.1.2 Platoon Leader Designates Routes		Designation of covered route	See II.1.1.2	See II.1.1.2
		Designation of a concealed route	See II.1.1.2	See II.1.1.2
1.1.2 Platoon Moves in Assault Position				
1.1.2.1 Platoon Uses Terrain		Use of covered routes	See I.4.3.1	See I.4.3.1
		Use of concealed routes	See I.4.3.1	See I.4.3.1
		Speed of movement in open areas	See I.4.3.1	See I.4.3.1
1.1.2.2 Section Leaders Control Movement		Section Leaders' control of movement	See II.1.1.3.2	See II.1.1.3.2
		Dispersion	See I.4.3.2.5	See I.4.3.2.5
		Section Leaders' command & control of forces	See I.4.3.2.7	See I.4.3.2.7
		Section's maintenance of integrity	See I.4.3.2.7	See I.4.3.2.7
		Tactical formation	See I.4.3.2.7	See I.4.3.2.7

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.2 Platoon Executes Assault on Objective	See III.1.1. The platoon assaults the objective			
1.2.1 Platoon Leader Orders Assault		Platoon Leader command & control of forces	The Platoon Leader orders the assault ___Y ___N	The assault must be explicitly initiated by the Platoon Leader.
1.2.2 Platoon Bounds to Objective		Closed hatches	The platoon's hatches are closed in the assault: Driver: Y N; Tank Commander: Y N Tank 1 – – – – Tank 2 – – – – Tank 3 – – – – Tank 4 – – – – Tank 5 – – – –	Hatches are closed during the assault on all of the platoon's tanks.
1.2.2.1 Platoon Uses Terrain		Use of covered routes Use of concealed routes Speed of movement in open areas	See I.4.3.1	See I.4.3.1
1.2.2.2 Section Leaders Control Movement		Section Leaders' control of movement Dispersion Section Leaders' command & control of forces Sections' maintenance of integrity Tactical formation	See III.1.1.2.2	See III.1.1.2.2
		Rate of assault	Number of tanks that come to a halt during the assault _____	Zero (assumes stabilized gunnery capability.)
1.2.2.3 Sections Use ATGM Counteraction Drill		Tanks zig & zag	Subjective Evaluation - tanks move in violent zig-zag path to objective	Zig-zagged.
1.2.3 Platoon Engages Targets on Objective	Platoon assaults objective with hatches closed. OPFOR on the objective include: Two threat tanks 800-1000m, hull down Three threat rifle squads 800-1000m Three threat tanks 1000-1400m, hull down Two threat rifle squads 600-800m			

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.2.3.1 Platoon Leader controls Indirect Fire		Platoon Leader request for indirect fire Platoon Leader adjusts indirect fire Platoon Leader communication	See II.1.2.2	See II.1.2.2
		Platoon Leader shifts indirect fire	The Platoon Leader requests indirect fire on TRPs located beyond the objective after initiating the assault ___Y ___N	(To be determined by Delphi at each battle run facility.)
1.2.3.2 Platoon Leader controls Direct Fire		Platoon stabilized gunnery Platoon target prioritization Platoon speed of fire	See II.2.1.3	See II.2.1.3.
		Platoon fire command Platoon pattern of fire Platoon distribution of fire Platoon Leader communication	See II.2.1.4.1	See II.2.1.4.1
		Platoon target neutralization	See II.2.1.4.2	See II.2.1.4.2
		Platoon masses fire power	Tanks employ fire power to suppress & neutralize OPFOR Tank 1 (MG,CX,.50) ___Y ___N Tank 2 (MG,CX,.50) ___Y ___N Tank 3 (MG,CX,.50) ___Y ___N Tank 4 (MG,CX,.50) ___Y ___N Tank 5 (MG,CX,.50) ___Y ___N	All available fire power is brought to bear on the objective.
1.3 Platoon Occupies Objective	The OPFOR on the objective has been neutralized by the platoon's assault.			
1.3.1 Platoon Moves Rapidly to Closest Cover		Platoon sweeps the objective	Subjective Evaluation - The platoon continues to move to the back edge of the objective ___Y ___N	The objective should be overrun to sweep & secure it.
		Skylining	Subjective Evaluation - The platoon does not crest the objective (See I.4.3.1)	The platoon does not skyline.
		Reduction of platoon vulnerability	See II.2.1.1	See II.2.1.1
		Dispersion	See I.4.3.2.5	See I.4.3.2.5
		Section Leaders' command & control of forces	See I.4.3.2.5	See I.4.3.2.5
		Sections' maintenance of integrity	See I.4.3.2.7	See I.4.3.2.7

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE DRILL
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.3.3 Platoon Leader Assigns Areas of Responsibility		Platoon Leader assignment of sectors of observation	See II.1.1.1	See II.1.1.1
		Platoon Leader assignment of sectors of fire	See II.1.1.1	See II.1.1.1
1.3.4 Platoon Leader Issues Situation Report		Situation report	Platoon Leader submits a situation report describing: 1. friendly situation 2. location 3. mission completion	Situation report is complete & accurate
		Platoon Leader communication	See II.2.1.4.1	See II.2.1.4.1
PHASE IV - CONSOLIDATION & REORGANIZATION AFTER AN ATTACK				
1.0 CONSOLIDATE POSITION (Refer to Appendix F. *Subtasks are not* evaluated in the offensive battle run.)				
2.0 REORGANIZE (Refer to Appendix F. Several subtasks are not evaluated in the offensive battle run.)				
2.1 Platoon Reports	Platoon has seized objective & consolidated the position in preparation for continuing operations.	Intraplatoon communication	TCs report to Section Leaders who in turn report to the Platoon Leader: Tanks 1 2 3 4 5 NA Y N NA Y N NA Y N NA Y N NA Y N Losses Ammo Expenditure Fuel Status Vehicle Condition	At a minimum the Platoon Leader receives information about rounds remaining by weapon type.

Table 4

SAMPLE (Cont'd.)
PLATOON BATTLE RUN
OFFENSE (DAY)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
2.2 Platoon Redistributes Supplies & Equipment		Redistribution of ammunition	Ammunition as reported above is distributed equally across tanks:	Remaining ammunition is distributed equally among tanks.

Tanks		# Rnds Before Distrib	# Rnds After Distrib
1	HEP SMOKE HEAT SABOT CX .50		
2	HEP SMOKE HEAT SABOT CX .50		
3	HEP SMOKE HEAT SABOT CX .50		
4	HEP SMOKE HEAT SABOT CX .50		
5	HEP SMOKE HEAT SABOT CX .50		

Table 5

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
PHASE I - PREPARATION & TRAVELING				
1.0 CONDUCT TACTICAL ROAD MARCH (Refer to Appendix F. Subtasks are not evaluated in the defensive battle run.)				
2.0 OCCUPY ASSEMBLY AREA (Refer to Appendix F. Several subtasks are not evaluated in the offensive battle run.)				
2.2 Platoon Established Local Area	Platoon has moved into an Assembly Area & is waiting for an order for the Defense by the Company/Team Commander (C/T CO). The order will be given in five min.	Platoon maintenance of integrity.	Subjective Evaluation - Five minutes before the C/T CO issues the Defense Order, are all vehicles & personnel assembled in one compact area for ease of control & supervision? No. of vehicles ___ No. of personnel ___	Five tanks & crews (20 personnel) are within close physical proximity of one another.
2.5 Platoon Practices Light, Noise, & Movement Discipline	See 2.2.	Reduction of platoon vulnerability	Subjective Evaluation - Number of times the platoon breaks light discipline ___ Subjective Evaluation - Number of times the platoon breaks movement discipline ___ Subjective Evaluation - Number of times the platoon breaks noise discipline ___	Zero Zero Zero
2.6 Platoon Maintains Listening Silence	See 2.2.	Reduction of platoon vulnerability	Number of non-radio check, radio transmissions initiated by the platoon while in the Assembly Area ___	Zero
3.0 PREPARE FOR & PLAN OPERATION (Refer to Appendix F. A few subtasks are not evaluated in the defensive battle run.)				
3.1 Troop Leading Procedures				
3.1.2 Platoon Leader Assembles Key Subordinates	The C/T CO gives the Platoon Leader an oral OPORD for a Conduct Relief in Place & Defend Mission. The OPORD includes: 1. threat & friendly situation - heavy OPFOR resistance is anticipated. 2. concept - including instructions to conduct relief in place & defend battle position 3. location of BP	Platoon Leader command & control of forces	Time C/T CO OPORD is received _____ The number of key subordinates (these having been identified earlier) who are present for delivery of the Warning Order _____.	No key subordinates absent

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRICTS	MEASURES	STANDARDS
3.1.2 (Continued)	4. mortar/artillery fires available 5. arrival time to be announced but platoon ready to move in one hour			
3.1.3 Platoon Leader Issues Warning Order	See 3.1.2. Key subordinates are assembled.	Completeness of Warning Order	The Warning Order contains the following information: Y N 1. Mission ___ ___ 2. Objective ___ ___ 3. Time OPORD will be given ___ ___ 4. Location where OPORD given ___ ___ 5. Instructions to ready platoon ___ ___	The Warning Order contains all six elements of information.
		Timeliness of Warning Order	Time C/T CO order is given: ___ ___ Time Warning Order given: ___ ___ Elapsed Time: ___	(To be determined by Delphi.)
3.1.4 Key Subordinates Disseminate Warning Order	See 3.1.3. Key subordinates have been given Warning Order. Ten minutes have elapsed.	Intraplatoon communication	One crewman from each tank is selected who was not present for delivery of the Warning Order but who must state the:	Randomly selected crewmen can state the three basic elements of the Warning Order

	Tanks									
	1		2		3		4		5	
	Y	N	Y	N	Y	N	Y	N	Y	N
1. Mission	___	___	___	___	___	___	___	___	___	___
2. Objective	___	___	___	___	___	___	___	___	___	___
3. Instructions	___	___	___	___	___	___	___	___	___	___

3.1.8 Platoon Leader Assembles Key Subordinates	The platoon is in an Assembly Area. The Platoon Leader has issued a Warning Order & planned the operation.	Platoon Leader command & control of forces.	The number of key subordinates (these having been identified earlier) who are present for delivery of the OPORD ___	No key subordinates absent
3.1.9 Platoon Leader Issues OPORD	See 3.1.8. Key subordinates are assembled.	Location of OPORD	Subjective Evaluation - Platoon Leader issues the OPORD at a location which gives a view of the terrain to be traversed. Y ___ N ___	Location permits platoon key subordinates to compare OPORD to terrain.
		Timeliness of OPORD	Time OPORD is given ___	Time is the same as indicated in Warning Order
		Completeness of OPORD	OPORD contains information about: Y N 1. Friendly situation ___ ___ 2. Enemy situation ___ ___ 3. Mission ___ ___ 4. Objective ___ ___ 5. Execution a) role of each section ___ ___ b) scheme of maneuver ___ ___ c) fire support ___ ___	

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
3.1.9 (continued)			6. Command & signal Y N a) key radio frequencies b) call signs c) phase lines d) check points e) chain of command	
3.1.10 Key Subordinates Disseminate OPORD	See 3.1.9. Key Subordinates have been given OPORD. Ten minutes have elapsed.	Intraplatoon communication	One crewman from each crew is selected who was not present for delivery of the OPORD but who must state the: Tanks 1 Y N 2 Y N 3 Y N 4 Y N 5 Y N 1. Mission 2. Objective 3. Scheme of Man. 4. Fire support 5. Key radio freq. 6. Call signs 7. Chain of command	Randomly selected crewmen can state these seven aspects aspects of the OPORD.
3.2 Platoon Leader/Sergeant Conducts Precombat Checks	See 3.1.4.	Preparation for operation	Checks reveal no uncorrected faults in: Tanks N F N F N F N F N F 1. Vehicles 2. Fuel 3. Heavy Weapons 4. Light Weapons 5. Ammo 6. Local Radio 7. Distant Radio 8. Crews (N = NO FAULT, F = FAULT)	No uncorrected faults
			Time platoon is ready to move	Platoon is ready to move in one hr.
4.0 DEPART ASSEMBLY AREA (Refer to Appendix F. A few subtasks are not evaluated in the defensive battle run.)				
4.3 Platoon Moves Out of Assembly Area				
4.3.1 Platoon Uses Terrain	Platoon moves out from Assembly Area to battle positions.	Use of covered routes	Fields of direct fire from likely OPFOR positions are determined. The percentage of the platoon's route that is uncovered from OPFOR fields of fire is estimated.	(To be determined by Delphi at each battle run facility.)
		Use of concealed routes	Fields of observation from likely OPFOR positions are determined. The percentage of the platoon's route that is unconcealed from OPFOR fields of observation is estimated.	(To be determined by Delphi at each battle run facility.)

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
4.3.1 (continued)		Speed of movement in open areas	Fields of direct fire & observation from likely OPFOR positions are determined. The platoon's rate of movement through uncovered or uncovered areas is determined.	(To be determined by Delphi at each battle run facility.)
4.3.2 Platoon Leader Controls Movement				
4.3.2.1 Platoon Leader Designates Route	See 4.3.1.	Planning of operation	Platoon Leader indicates: Y N 1. Covered & concealed route(s) AA to BP ___ ___ 2. Overwatch positions AA to BP ___ ___ 3. Obstacles ___ ___ 4. Bounds by a) OW position ___ ___ b) route to next OW position ___ ___ c) next OW position ___ ___	(To be determined by Delphi at each battle run facility.)
4.3.2.3 Platoon Follows Route Designated by Platoon Leader	See 4.3.1.	Platoon Leader control of movement	Platoon routes from AA to BP are compared to maneuver routes planned in 4.3.2.1	Planned routes are followed
4.3.2.4 Platoon Conducts Tactical Movement to Battle Position	See 4.3.1.	Dispersion	Distance between tanks in meters	No two tanks are closer together than 50 meters
		Section Leader's command & control of forces	At two minute intervals from the AA to the BP are the other tanks in each section visible from the Section Leader's tank? LS HS Y N Y N Time AA + 2 minutes ___ ___ ___ ___ + 2 minutes ___ ___ ___ ___	(To be determined by Delphi at each battle run facility.)
4.3.2.5 Sections Maintain Integrity	See 4.3.1.	Sections' maintenance of integrity	Subjective Evaluation - Tanks in each section follow the section leader & do as he does.	Distance between sections is greater than between tanks within sections.
4.3.2.6 Platoon Leader & Platoon Sergeant Communicate	See 4.3.1.	Visual signalling	Subjective Evaluation - Tanks within sections communicate by hand & arm signals. Sections communicate by flag signals.	Visual signals are employed.
		Reduction of platoon vulnerability	Number of radio transmissions initiated by the platoon between the AA & the LD _____	Zero
4.3.2.7 Platoon Reaches BP on Time	See 4.3.1.	Platoon Leader's control & command of forces	Time platoon reaches BP _____	BP reached on schedule

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
PHASE II - OCCUPY BATTLE POSITION				
2.0 CONDUCT RELIEF IN PLACE (Refer to Appendix F. A few subtasks are *not evaluated in* the defensive battle run.)				
2.1 Coordination of Relief	Friendly platoon occupying battle position. Platoon has arrived at last covered & concealed position *prior* to battle position. Platoon Leaders coordinate relief.	Planning of operation	Does the relieving Platoon Leader have the map overlays & know the sectors of responsibility?	Receipt of all map overlays & knowledge of all sectors of responsibility.
			Statement of withdrawal routes & times from both Platoon Leaders.	Perfect agreement as to withdrawal routes & times
			Does the Platoon Sergeant visit each vehicle position?	Platoon Sergeant visits all vehicle positions.
			Is the relieving platoon given the range cards for the primary & alternate positions?	Range cards for all vehicle locations transferred.
2.2 Platoon Moves Into Primary Battle Positions	Relieved platoon has withdrawn.			
2.2.1 *Tanks* Take Up Position Without Hesitation	See 2.2.	Reduction of vulnerability	Are tanks ground guided into position by the *loaders?*	All tanks ground *guided* into vehicle position by respective loaders.
			Time for all tanks to move into vehicle positions _____.	(To be determined by Delphi at each battle run facility.)
			Fields of observation *from* likely OPFOR positions are determined. The percentages of each tank *uncovered* from these positions are estimated.	(To be determined by Delphi at each battle run facility.)
2.6 Platoon Lays Wire for Communication	See 2.2.	Intraplatoon communication	Does the platoon use hot loop? ___Y ___N	Yes
			The number of tanks connected on the hot loop _____	No tanks not connected
			The number of sentries connected on the hot loop _____	No sentries not connected
2.7 Platoon Inspects Alternate Positions	See 2.2.	Preparation for operation	Number of tank commanders who physically inspect alternate positions _____	All tank commanders inspect alternate positions
			Number of tanks driven to alternate positions _____	All tanks driven to alternate positions

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
2.8 Platoon Practices Light, Noise, & Movements Discipline	See 2.2.	Reduction of vulnerability	Subjective Evaluation - Number of times platoon breaks light discipline _____	Zero
			Number of times platoon breaks noise discipline _____	Zero
			Number of times platoon breaks movement discipline _____	Zero
3.0 PREPARE & PLAN DEFENSE (Refer to Appendix F. A few subtasks are not evaluated in the defensive battle run.)				
3.1 Troop Leading Procedures				
3.1.1 Platoon Leader Reconnoiters	Relief is complete & all vehicles are in position.	Planning of operation	Subjective Evaluation - Does the Platoon Leader conduct an on-the-ground evaluation?	On-the-ground reconnaissance covers all sectors of battle position.
			Number of TRPs identified correctly on-the-ground _____	All TRPs correctly identified
3.1.3 Platoon Leader Selects Supplemental Positions	See 3.1.1.	Selection of unrestricted positions	The percentages of the fields of fire where firing is restricted or hindered _____	(To be determined by Delphi at each battle run facility.)
			The percentages of the fields of observation where observation is restricted or hindered _____	(To be determined by Delphi at each battle run facility.)
		Selection of covered & concealed positions	Subjective Evaluation - Fields of observation from likely OPFOR positions are determined. Estimations of the percentages of each tank uncovered or not concealed are made.	(To be determined by Delphi at each battle run facility.)
3.1.4 Platoon Leader Develops a Fire Plan	See 3.1.1.	Intraplatoon communication	Number of TRPs correctly identified by each tank commander _____	No errors
			Number of tank commanders who can accurately point out their sector of fire _____	All tank commanders should be able to state sector of fire
		Planning of operation	Has Platoon Leader developed a plan of illumination? ___Y ___N	Yes
			Has Platoon Leader developed a plan of indirect fire? ___Y ___N	Yes
		Intraplatoon communication	Number of tank commanders who know the indirect fire plan _____	All tank commanders should know indirect fire plan

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
3.1.6 Platoon Leader Briefs Platoon on Movement to Supplemental BP	See 3.1.1.	Intraplatoon communication	Number of tank commanders who know route to supplemental position & overwatch position(s) ___	Tank commanders should make no errors in indicating route & overwatch position(s)
			Number of drivers who know route to supplemental position & overwatch position(s) _____	Drivers should make no errors in indicating route & overwatch position(s)
		Designation of covered routes	See I.4.3.1	See I.4.3.1
		Designation of concealed routes	See I.4.3.1	See I.4.3.1
		Efficiency of preparation	Time to completely occupy position _____	30 minutes
PHASE III - DEFENSE OF BATTLE POSITION				
1.0 PLATOON REACTS TO CONTACT	Platoon has occupied positions.			
1.1 Platoon Acquires All Visible Targets	Three threat tank companies sighted 1000-1600m. Incoming artillery.	Target acquisition	Platoon Leader issues acquisition report to C/T CO including: 1. who is reporting _____ 2. target description (3 tank Co) __Y __N 3. location _____ 4. target action _____ 5. observer action _____	Acquisition report is complete & accurate
		Response to incoming artillery	Number of tanks with hatches closed _____	Close hatches during incoming artillery.
1.2 Platoon Leader Requests Indirect Fire	See 1.1.	Platoon Leader request for indirect fire	Number of times Platoon Leader requests indirect suppressive fire _____	(To be determined by Delphi at each battle run facility.)
			Preplanned fires called: Time Coordinates 1. 2. 3.	(To be determined by Delphi at each battle run facility.)
		Platoon Leader adjusts indirect fire	TRP data given to adjust fire at coordinates (_____) Adj. 1. _____ 2. _____ 3. _____	Indirect fire falls on target within three adjustments.

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.2 (continued)				
1.3 Platoon Leader Controls Direct Fire		Platoon Leader communication	Subjective Evaluation - Platoon Leader uses proper RTP and CEOI	Proper RTP & CEOI used.
1.3.1 Platoon Leader Requests Illumination	See 1.1.	Platoon Leader request illumination	Number of times Platoon Leader requests illumination _____	(To be determined by Delphi at each battle run facility.)
			Preplanned illumination called: 1. 2. 3.	(To be determined by Delphi at each battle run facility.)
1.3.2 Platoon Uses IR Flicker Illumination as Needed	See 1.1.	Platoon Leader communication	Subjective Evaluation - Platoon Leader uses Proper RTP & CEOI	Proper RTP & CEOI used.
		Use of IR flicker	Is placement of illumination directed by TRPs or checkpoints? ___Y ___N	IR illumination should be directed by TRPs or checkpoints
			Subjective Evaluation - Is flicker technique used properly?	The flicker technique is properly used.
1.3.3 Platoon Leader Issues Fire Command	See 1.1.	Platoon Leader issuance of fire command	Platoon Leader fire command specifies: Alert _____ Weapon/Ammo _____ Description _____ Location _____ Control _____ Execution _____	Fire command is accurate & complete.
1.3.4 Platoon Distributes Fire	See 1.1.	Platoon distribution of fire	Fire was distributed by: Nearest half ___Y ___N Sector of fire ___Y ___N Engagement area ___Y ___N Number of targets not engaged _____ Number of targets engaged by more than one vehicle _____	Zero Zero
		Platoon pattern of fire	Analysis of data shows that platoon used a: Frontal pattern _____ Cross pattern _____ Depth pattern _____	The pattern of fire used was appropriate.
1.3.5 Platoon Leader Uses Proper RTP & CEOI	See 1.1.	Platoon Leader communication	Subjective Evaluation - Platoon Leader uses proper RTP & CEOI	Proper RTP & CEOI is used.

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.4 Platoon Neutralizes Target(s)	See 1.1.	Target prioritization	The sequence in which targets are engaged by the platoon: Tanks: 1st Eng / 2nd Eng / 3rd Eng / 4th Eng / Closest Target 1 (MG,CX,.50) T#__ T#__ T#__ T#__ T#_____ 2 (MG,CA,.50) T#__ T#__ T#__ T#__ T#_____ 3 (MG,CA,.50) T#__ T#__ T#__ T#__ T#_____ 4 (MG,CA,.50) T#__ T#__ T#__ T#__ T#_____ 5 (MG,CA,.50) T#__ T#__ T#__ T#__ T#_____ [Matrix repeated for each of three threat arrays.]	Tanks engage the closest of the most dangerous targets first.
		Speed of engagement	Time in seconds for each tank to take a target under fire: Tank 1 _____ Tank 2 _____ Tank 3 _____ Tank 4 _____ Tank 5 _____	Fire first fast within five seconds.
		Neutralization of targets	Array 1: Number of hits _____ Array 2: Number of hits _____ Array 3: Number of hits _____	All three tank companies neutralized.
1.5 Platoon Leader Controls Movement	See 1.1.	Platoon Leader control of movement	Number of tanks moving from primary position to alternate positions after engagement _____ Number of tanks returning to turret defilade after engagement _____	All tanks move after each engagement. All tanks return to turret defilade after each engagement.
1.6 Platoon Leader Issues Spot Report	See 1.1.	Spot report	Platoon Leader submits a spot report describing: 1. enemy situation 2. location of enemy 3. outcome of contact	Spot report is accurate & complete.
PHASE IV - MOVEMENT TO SUPPLEMENTAL BATTLE POSITION				
1.0 CONDUCT TACTICAL MOVEMENT	Company commander orders platoon to move to subsequent position. Contact with OPFOR is imminent.			
1.1 Platoon Leader Initiates Movement to Supplemental Battle Position				
1.2 Platoon Moves in Sections Using Bounding Overwatch				
1.2.1 Platoon Leader Designates Bounding & Overwatch Sections				
1.2.2 Designated Section Overwatches		Assignment of sectors of observation	Each OW TC indicates left & right boundaries of his crew's area of responsibility.	Assigned sectors of responsibility contain no gaps.

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.2.2 (continued)		Assignment of sectors of fire	OW section leader identifies likely OPFOR positions	(To be determined by Delphi at each battle run facility.)
			Each OW TC indicates left & right boundaries of each crew's area of responsibility for fire	Assigned sectors of fire contain no gaps.
			Each OW TC indicates likely OPFOR positions within his sector of fire	(To be determined by Delphi at each battle run facility.)
		Effectiveness of OW position	The range in meters to likely OPFOR positions	OPFOR positions within range of OW section
		Reduction of OW section vulnerability	Subjective Evaluation - OW vehicles are in covered, hull-defilade positions with respect to likely enemy positions: Y N Tank 1 ___ ___ Tank 2 ___ ___ (Tank 3 ___ ___)	
1.2.3 Platoon Leader Controls Movement	See IV.1.0.	Platoon Leader control of movement	Does Platoon Leader order section to bound: Y___ N ___	Each bound should be ordered by Platoon Leader
1.2.4 Designated Section (B) Bounds				
1.2.4.1 B Section Uses Terrain	See IV.1.0.	B section use of covered routes	Fields of direct fire from likely OPFOR positions are determined. The percentage of the platoon's route that is uncovered from OPFOR fields of fire is estimated.	(To be determined by Delphi at each battle run facility.)
		B section use of concealed routes	Fields of observation from likely OPFOR positions are determined. The percentage of the platoon's route that is unconcealed from OPFOR fields of observation is estimated.	(To be determined by Delphi at each battle run facility.)
		B section speed of movement in open areas	Fields of direct fire & observation from likely OPFOR positions are determined. The platoon's rate of movement through uncovered or unconcealed areas is determined.	(To be determined by Delphi at each battle run facility.)
1.2.4.2 B Section Leader Controls Movement	See IV.1.0.	B section leader control of movement	B section route in first bound is compared to planned route (See I.3.1.8.1) See I.4.3.2.4 (Tanks visible)	Planned route is followed See I.4.3.2.4
		B section dispersion	See I.4.3.2.4	See I.4.3.2.4
		B section maintenance of integrity	See I.4.3.2.5	Tanks follow section leader's lead
		B section rate of movement to new OW	Time from LD to new OW _____ Distance from LD to new OW _____ Speed in m/min _____	(To be determined by Delphi at each battle run facility.)

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
1.2.5 B Section Overwatches	Contact with the OPFOR if imminent. The bounding section has reached the new OW. The other section is still in primary position.	B (OW) Section Leader assignment of sectors of observation.	See IV.1.1.1.	See IV.1.1.1
		B (OW) Section Leader assignment of sectors of fire	See IV.1.1.1.	See IV.1.1.1
		Effectiveness of OW position	See IV.1.1.1.	See IV.1.1.1
		Reduction of B (OW) section vulnerability	See IV.1.1.1.	See IV.1.1.1
		Visual signaling	Does bounding section signal occupation of new OW position? ___Y ___N	Filtered light is employed.
1.3.1 OW Section Leader Controls Direct Fire	See IV.1.2.5.	OW section fire command	Does OW Section Leader issue section fire command? ___Y ___N	OW fire is controlled by OW Section Leader.
		OW Section Leader control of suppressive fire	Number of HEP rounds fired at likely OPFOR positions as moving section bounds _____	(To be determined by Delphi.)
			Number of smoke rounds fired to observe likely OPFOR positions as moving section bounds _____	(To be determined by Delphi.)
			Number of OPFOR likely positions suppressed by machinegun fire _____	(To be determined by Delphi.)
1.3.2 OW Section Leader Controls Indirect Fire	See IV.1.2.5.	OW Section Leader request for indirect fire	Number of times OW Section Leader requests indirect suppressive fire _____	(To be determined by Delphi.)
			Number of times OW Section Leader requests indirect obscurational fire _____	(To be determined by Delphi.)
			Preplanned fires called: Time Coordinates 1. 2. 3.	(To be determined by Delphi.)
		OW Section Leader adjusts indirect fire	TRP data given to adjust fire at coordinates (_____) Adj. 1. _____ 2. _____ 3. _____	Indirect fire falls on target within three adjustments
		OW Section Leader communication	Subjective Evaluation - OW Section Leader uses proper RTP & CEOI	Proper RTP & CEOI is used
1.3.3 B Section Employs Recon-by-Fire	See IV.1.2.5.	B section recon-by-fire	Number of likely threat positions along route that are suppressed with machinegun fire _____	(To be determined by Delphi at each battle run facility.)
1.4.3 Platoon Leader & Platoon Sergeant Communicate	See IV.1.2.5.	Intraplatoon communication	Are communications by tanks within sections by filtered lights? ___Y ___N	Intrasection communication employs filtered light

Table 5 (Cont'd.)

SAMPLE
PLATOON BATTLE RUN
DEFENSE (NIGHT)

PHASES, TASKS, SUBTASKS	CONDITIONS	CONSTRUCTS	MEASURES	STANDARDS
			Are communications between sections by radio? ___Y ___N	Communication between Platoon Leader & platoon sergeant employs radio.
			Is proper RTP & CEOI used? ___Y ___N	Proper RTP & CEOI is employed.
1.4.4 Light & Noise Discipline Maintained	See IV.1.2.5.	Reduction of platoon vulnerability	Subjective Evaluation - Number of times the platoon breaks light discipline _____	Zero
			Number of times platoon breaks noise discipline _____	Zero
PHASE V - DEFENSE OF SUPPLEMENTAL BATTLE POSITION				
1.0 PLATOON REACTS TO CONTACT . . . . . 1.6 Platoon Leader Issues Spot Report	Platoon has moved to supplemental battle positions where they are confronted by a succession of target arrays under conditions of incoming artillery: 1 rifle company 800-1000m, 8 BMPs, 4 tanks			
1.0 PLATOON REACTS TO CONTACT . . . . 1.6 Platoon Leader Issues Spot Report	1 rifle company 600-800m 6 BMPs, 2 tanks Dismounted troops 600-800m			
ANALYSIS PROCEEDS AS IN PHASE III: DEFENSE OF BATTLE POSITION				

IV. COLLECTION OF PERFORMANCE DATA

The host of constructs and measures presented in the preceding section were derived under a "best case" set of assumptions. During the specification process an idealized view of both the offensive and defensive scenarios was maintained to insure that all conceivably relevant constructs and measures were considered. In doing so the potential restrictions and limitations that might be encountered at an actual battle run facility were purposely ignored. However, in discussing potentially useful performance data collection techniques and procedures, such restrictions need to be considered. The pragmatics involved in actually implementing a battle run will impact directly on what aspects of platoon performance can be evaluated. That is, at any particular facility a *subset* of the constructs and measures in Tables 4 and 5 may apply. This subset will in turn dictate what data collection procedures are likely to be useful at that facility. Both issues are considered below.

BATTLE RUN IMPLEMENTATION

The constructs and measures presented in Tables 4 and 5 can be divided into two basic sets. The first contains entries that are universal in nature. They are subject to no restrictions and theoretically can be addressed at any battle run facility. Perhaps the best general examples of this first set are the Platoon Leader planning activities leading up to and including issuance of the OPORD, and the platoon's RTP and CEOI behavior. The constructs and measures in the second and larger set are *not* generally applicable. They are subject to a variety of limitations, most of which surround the size and nature of the terrain on which the battle run is to be conducted and attendant safety considerations. Examples in this second set would include platoon/section tactical movement. For instance, the controlled firing lanes in use at Grafenwörh preclude assessment of the platoon's overwatch and bounding performance. Similarly, at virtually all facilities safety precautions associated with live firing preclude firing by the overwatch section.

These and many similar constraints indicate just how unique each facility's implementation of a battle run really is. At each location the opportunities for measurement presented in Tables 4 and 5 must be carefully culled in order to identify that set of constructs and measures on which to base the platoon's evaluation. Under such conditions standardizing the content of the test across facilities may be virtually impossible.

Given that one has considered what can be evaluated at a particular facility the next issue becomes one of determining precisely how to implement the test. Major alternatives include service firing, subcaliber firing, or dry firing the battle run. The use of an engagement simulation approach based on systems like REALTRAIN or MILES is another possibility. Decisions are also required about the nature of the target arrays that will be presented as well as what kinds of targets are to be used (e.g., pop-up and knock-down). Each of these decisions in turn will have an impact on what data collection techniques seem reasonable. Again, the data collection procedures that prove most feasible and effective will presumably vary from site to site. Accordingly, in the first phase of research general data collection strategies were considered.

DATA COLLECTION

The data collection procedures typically used in Table IX parallel those used in the preceding eight gunnery tests and training exercises. One or more evaluator personnel accompany the tanks on their missions and record their impressions of platoon performance on appropriate score sheets. Typically the task of the evaluator(s) is to monitor platoon performance with respect to a fairly limited set of behaviors. In the past these behaviors have ranged from those that were fairly objective and reasonably well articulated (e.g., 70% target hit/kills) to those that were extremely subjective (e.g., maintain command). Some as in Tables 4 and 5 are reasonably discrete and occur infrequently (e.g., platoon leader issuance of spot reports). These can be monitored rather well, even when the number of evaluators is small. Others are more continuous, occurring throughout the course of the battle run (e.g., movement technique). They are correspondingly harder to measure because the evaluator(s) must aggregate or otherwise monitor (i.e., sample) the performance of the platoon on that dimension over time. Similarly, many such behaviors involve the coordinated actions of the whole platoon, actions which a single observer may not be in a position to observe, or which multiple observers may not be readily able to collate.

Finally, the task of the evaluator(s) is made even more difficult by the imposition of regulations designed to maximize safety and minimize evaluator influence on platoon actions. Accordingly, at many testing sites evaluator personnel are not permitted to ride on the tank turret or bustle. Instead, they must follow *behind* the tanks in jeeps or APCs; they are usually required to follow the trailing section as well. These requirements often make it virtually impossible to observe all that is going on because of the inferior vantage points the restrictions impose on evaluator personnel.

In the current phase of research the feasibility of video-taping platoon battle runs was explored as one possible alternative or adjunct to the typical use of evaluator personnel. To evaluate the video-taping procedures under a range of conditions, arrangements were made to tape offensive battle runs at two different locations exhibiting pronounced variations in terrain.

Method, Fort Carson, Colorado. Arrangements were made to video-tape platoon battle runs at Ft. Carson in mid November, 1978. Toward this end project staff reviewed the OIC's plans for the runs, traversed the actual terrain to become familiar with target arrays and locations, and chose vantage points from which to video-tape.

The equipment consisted of a battery-pack-powered, portable, black-and-white, Sony Rover video camera and recorder system. The camera was equipped with a zoom lens (15mm - 150mm), and an external microphone which recorded signals from a radio set tuned to the platoon net. The recorder accepted standard video tape cassettes. A telephoto, single-lens-reflex, 35mm camera system served as a backup and was used to highlight events of particular interest.

The equipment was mounted high on a hillside which provided a reasonably unobstructed view, North, along the battle run area for approximately 4000m. A very slight dog-leg to the east, and a knoll in the middle of the course, were the only obstacles to an otherwise excellent view. The hillside was behind and approximately 200m from the Line of Departure.

Five offensive platoon battle runs were video-taped using the Sony system in the location described above. Taping occurred on two consecutive days from early morning until late afternoon. Weather conditions were sunny and clear with occasional periods of light snow that reduced visibility, limiting taping to the first 2000m or so of the course.

Method, Fort Knox, Kentucky. Arrangements were made to video-tape Master Gunner platoon battle runs in February, 1979, at Ft. Knox's St. Vith range. Building on the earlier Ft. Carson experience and on prior reconnaissance of the St. Vith facility, an ambitious video-taping was undertaken. Two battle runs were taped, a dry-fire practice run and a livefire service ammunition run.

During the livefire run, taping was attempted from three vantage points. One crew was stationed at the St. Vith tower to capture the platoon's approach to the final assault position and its subsequent assault on the objective. A second crew was positioned in an APC at the LD. This crew

taped the platoon as it proceeded from the LD to the AP. A third crew in an APC followed the Platoon Leader's tank and the OIC's APC down range, through the entire battle run.

In the dry-fire run, taping crews were again positioned at the St. Vith tower and at the LD. Two additional crews occupied Threat positions and focused on the platoon as it approached their positions, one of which was on top of the objective. The assumption was that this approach would facilitate subsequent evaluation of performance, particularly in maneuver and in use of cover and concealment. The equipment was essentially the same as used at Ft. Carson. Taping occurred on one day from early morning to mid afternoon. The weather was intermittantly cloudy. The course was conducted through heavily wooded areas.

Results. Video and audio tapes obtained from both sites were analyzed with respect to how well the approach might supply the kinds of data needed to support the performance evaluation system. The findings fall into three general areas including the mechanics of video-taping, the potential utility of the approach from a data collection viewpoint, and its potential utility as a training/debriefing device.

Video tapes from Ft. Carson were generally encouraging but revealed a number of "techniques" needing improvement. The battery packs occasionally acted up because of the cold weather. Taping of the platoon radio net was less than optimal because of failure to obtain the full TC-crew, TC-section leader, section leader-Platoon leader, Platoon Leader-senior evaluator net. Most serious was an inability to reach a compromise between the actions of the full platoon (with the wide-angle lens) and those of a platoon element (with the telephoto capability). Also annoying was an inability to properly judge best levels of contrast using only the camera viewfinder.

Video tapes of the Master Gunner platoon battle runs also uncovered several problems in technique. Taping from moving vehicles was not productive either in terms of image quality or in terms of the rather limited portion of the platoon that could be photographed. Furthermore, even in the stationary APC's the power supply was a problem. The video recorder and camera system exerted a considerable drain on the APC's batteries. As a consequence the engine had to be run to maintain a charge. The resulting noise interfered with the pick up of audio communications through the video camera microphone. These problems are soluble.

There is one problem, however, that is less easy to deal with. The camera lenses that are currently available are not of a sufficiently long focal length to capture the detail of

platoon behaviors. As an example, the concept of locating a camera in a threat position is extremely appealing; but one would then like to be able to spot the platoon at the longest range possible. Relatively short focal length lenses make this task difficult if not impossible either during taping or subsequent playback. Conversely, there are cases in which a shorter focal length, wider angle lens is useful. The answer appears to lie in the eventual development of zoom lenses having greater telescopic capability.

In terms of its utility for data collection, video-taping of battle runs appears to be a useful adjunct to the use of evaluator personnel who travel down range with the platoon. It seems particularly useful in getting at aspects of performance having to do with deployment, platoon/section integrity, movement techniques, requests for indirect fire, reporting techniques, etc. (The latter aspects of performance could be gotten at simply by audio-taping, of course.) These behaviors are more holistic in nature and require the evaluator to consider the relative position of tanks within sections, and of one section to the other. The overview provided by video-taping, *given that cameras can be mounted in good over-watch positions*, should prove helpful in evaluating performance.

More microscopic aspects of performance are not as amenable to evaluation from video tapes. This is partly a function of the inadequate telescopic capability presently available. For example, it is difficult if not impossible to get at such aspects of performance as fire control, distribution, or effect. Nor can one make adequate determinations about the degree of cover afforded by various hull-defilade positions. Needless to say, none of these measures can be collected at night.

Perhaps the most promising use for video-taping lies in its rapid feedback capabilities. At both Ft. Carson and Ft. Knox it was possible to play back the battle run just completed by a platoon. This immediate playback was of great interest to the participating crews and was taken advantage of by evaluator personnel when pointing out particularly effective or ineffective performance to the platoon.

An extension of this idea, and one being actively pursued under the current project, is the video-taping of especially poor and then exemplary battle runs for teaching purposes. This approach offers promise in illustrating the differences between poor and good performance, particularly along some of the more holistic dimensions.

Implications. Given certain assumptions, video-taping of platoon performance during conduct of a battle run represents one procedure for obtaining data that otherwise are hard to collect. The assumptions include the use of qualified/trained

cameramen, adequate power sources, guidelines with respect to what aspects of platoon performance are to be taped, and adequate visibility in terms of vantage point, intervening terrain, and weather. The terrain requirements in particular suggest that this procedure may be particularly well suited to some locales but not to others.

In the process of observing and taping some eight different battle runs it still appears that the key data collection procedure must necessarily involve the use of trained evaluator personnel who accompany the platoon on its mission. Improved evaluation seems to depend less on sophisticated advancements in technology and more on what evaluators are told to look for or to make judgments about. Given that they are to make aided or unaided judgments about specific and objective aspects of platoon performance, several steps need to be taken.

Multiple observers are required, particularly in order to assess the many aspects of platoon gunnery. One approach would be to have one evaluator per tank, plus a chief evaluator to maintain control and to insure safety. Arrangements may have to be made to locate evaluators unobtrusively *on* the tanks. This step may be necessary in order to place evaluators in a position that permits them to observe key aspects of platoon performance. Whenever possible, attempts should be made to tape record the platoon radio net. These modest changes may have a big impact on the quality and quantity of evaluative data that can be obtained from battle runs.

V. INTERPRETATION OF PERFORMANCE DATA

One essential ingredient of a performance assessment system consists of a set of objective and relevant measures of performance. A second ingredient is provision for the appropriate kinds and amounts of high quality data for each measure. A third essential ingredient is a framework within which to evaluate the obtained performance data, making decisions about how good or bad the performance is, and whether it is or is not acceptable. The framework is provided by performance standards or benchmarks and a method for aggregating the resulting scores to reach training-diagnostic and/or qualification decisions.

SPECIFICATION OF STANDARDS

In theory it is possible to assign at least two entirely different kinds of standards to performance data associated with the constructs and measures presented in Tables 4 and 5. The first is a training-system standard and is referenced to expectations about what the (platoon's) level of proficiency should be at different levels of experience or after different amounts of training. Such standards are usually developed on the basis of past experience with similar training programs and may either be norm-referenced (e.g., "after a given amount of practice the *typical* platoon is usually at about this level of proficiency"), or criterion-referenced (e.g., "midway through the program a platoon must have mastered x, y, and z if it expects to graduate on time").

The second type of standard is usually referenced to the combat environment. It represents a performance *requirement*, and as such is the level of proficiency required to cope with threat capabilities, independent of the performance expectations that one may have for troops during or upon completion of the training process. The combat-referenced standards should be criterion-referenced (e.g., "platoons must deliver fire within five seconds," a level of performance necessary on the battlefield). In spite of this the standards are often thought of in norm-referenced terms (e.g., "this platoon's opening time is eight seconds which places it in the top 30 percent of all platoons"). Clearly, both training-system and combat frames of reference are needed to support training and evaluation of platoon battle run performance.

Returning again to Tables 4 and 5 it will be noted that entries in the fifth or "STANDARDS" column are of three basic varieties. The first type, of which there are relatively few examples, represents levels of performance that are deemed necessary and/or sufficient as indicated by current doctrine.

For instance the dictum "fire first fast" has been specified in terms of a five-second opening time. Standards of this type, which are anchored solidly in doctrine, are presumably of the combat-referenced variety.

The second type of standard supplied in Tables 4 and 5 is of the checklist variety and may be either combat or training-system referenced. The performance in question usually requires some product such as the issuance of an OPORD. One measurement construct, therefore, is the completeness of the OPORD, as indicated by measures that address the six basic elements of such an order. In this example, the standard is simply the requirement that all six elements of the order be included.

The third and most interesting type of standard in Tables 4 and 5 is one which must be empirically determined. These have been indicated by the statement that the standard is "to be determined (by some procedure) at each battle run facility." At issue is the fact that the standard will vary as a function of the specific setting in which the battle run will be conducted. The standard will also fluctuate according to the level of experience or training that is specified (e.g., Master Gunner platoon level of proficiency, AOB platoon level of proficiency, combat experienced platoon level of proficiency). The key is to forecast what performance will look like under a given set of conditions. These forecasts can then be used as standards for evaluating platoons that perform under the same conditions.

A number of different methods for developing forecasts presumably exist. One approach is to use a panel of military experts who are required to arrive at a consensual judgment as in the Delphi technique (Dalkey & Helmer, 1963; Girshick, Kaplan, & Skogstad, 1950; Gordon & Helmer, 1964; North, 1968). Another approach is to have various military subjects (e.g., battle run evaluators, instructors, students, or field units) play board games that represent simulations of battle run missions.

Pilot research has been conducted during this first phase of the project to determine the feasibility of using board-gaming and board-gaming with Delphi procedures to develop training-system-referenced standards for the kinds of constructs and measures included in Tables 4 and 5. The board game in use is based on a 1:3125 photomap of terrain at Fort Carson, Colorado. The map and an accompanying set of gaming rules were developed in related research addressing combined arms tactical exercises (Medlin, 1979).

Using a variant of the original rules, pilot groups of Master Gunner and AOB students have carried out offensive battle run missions on the Fort Carson photomap. The basic offensive scenario is patterned after the one described in FM 17-12-2, Change 2 (1978). The game is limited to one player at a time, whose moves, made in response to a developing tactical situation and in accordance with the game's rules, are carefully recorded. To date the patterns of responses, particularly in such holistic aspects of performance as maneuver routes and the location of preplanned fire, show a good deal of consistency. This outcome is very encouraging and suggests the feasibility of using the approach to set training-system-referenced performance benchmarks or standards. Pilot research is also underway in which Delphi groups of instructor personnel are being asked to play the battle run in order to develop "school solutions" for both offensive and defensive scenarios. Both types of study are discussed in Appendix G.

AGGREGATION OF SCORES

Assuming the availability of data on a variety of platoon battle run performance measures, and of standards in terms of which to interpret different levels of proficiency, the final step is to aggregate all of the discrete statements about proficiency into more global or summary pronouncements. Toward this end methods are required for the aggregation of pass/fail scores on separate aspects of performance into one or more summary scores. Similarly, ways are needed of interpreting the many discrete scores that will be of value for training diagnosis.

Scoring for qualification. The principal reason given for annual exposure of tank platoons to Table IX is platoon qualification. In one sense qualification implies eligibility to participate in subsequent training exercises at the company or battalion level. In another it suggests that a qualified platoon is one which is combat ready, either capable of entering into combat or, once in combat, capable of succeeding. In still another sense to qualify means to be fit, to exhibit a required degree of ability.

It is this last definition which is basic. To qualify a platoon must reach or exceed a certain level of ability which is prerequisite and essential. Within the domain of platoon battle runs the concept of "a certain level of ability" assumes two distinct meanings. First, each time the platoon engages in a type of behavior (e.g., target prioritization) selected for evaluation, the platoon's proficiency must equal or exceed generally agreed upon standards. Second, the platoon must demonstrate its capacity to meet such standards on a large proportion of the occasions in which the behavior is exhibited.

The first step in scoring for qualification is to apply the appropriate standards to each type of battle run performance every time it occurs. For example, if the measure under consideration reflected the light section's prioritization of threat targets, a score of "1" would be assigned each time the section performed in accordance with standards and a "0" would be given whenever it did not do so. The need for aggregation arises for those measures on which performance is evaluated several times during the course of the battle run. Having had several opportunities to neutralize targets for example, there will be a sequence of "1s" and "0s" that describes the platoon's (or section's) performance. The purpose of aggregation is to reduce such an array of information to a single statement which summarizes the level of performance demonstrated (e.g., threat targets were prioritized correctly in four of six offensive engagements).

However, a theoretically complex psychometric problem underlies the aggregation of scores. At issue is whether the individual items measure the same construct, permitting a pooling or aggregation which is logically meaningful. In the extreme, were no form of aggregation defensible, performance would have to be considered on an item by item basis. Empirical procedures such as Rasch modelling can be used to shed light on this issue by scaling test items. These procedures, however, cannot be applied until a prototype of the test has been used to generate data. They also require large amounts of data obtained from repeated tests of the same platoons. Consequently, development of aggregation procedures for qualification on a test like Table IX must proceed on rational grounds.

Two alternatives suggest themselves. The first would assume that platoon gunnery represents a single construct. It would further assume that the various measures used to characterize Table IX performance can, by definition, be pooled to provide an estimate of performance based on a single aggregate score. The Table IX presented in FM 17-12-2 (1977), for example, makes this assumption and aggregates point scores across engagement, and even more significantly, across gunnery skills. The second approach assumes that platoon gunnery can be divided into a number of components representing different kinds of skills or aspects of performance. In this approach, scores belonging to each category would be aggregated to represent each component, and platoon competence would be evaluated in terms of each. This alternative assumption underlies the Table IX described in Draft FM 17-12-2, Change 2 (1978). In order to qualify, the "Platoon must have hit 70% of the targets and have received satisfactory evaluations for control of fire, movement techniques, use of terrain, command and control, and reporting procedures . . . "(p. 71). The

domain of battle run performance is assumed to be multifaceted. Demonstrated competence with respect to *each* facet is required for qualification.

Based on the results of the present research, the domain of performance comprising the offensive platoon battle run has been expanded to include 10 separate facets:

Preparation and Planning
Techniques of Movement
Use of Terrain
Fire and Maneuver
Distribution of Fires
Engagement of Multiple Targets
Reporting Techniques
Security
ATGM Counteraction Drill
Indirect Fire

The defensive mission includes these same facets with the exception of the ATGM Counteraction Drill.

Satisfactory performance within each aspect of battle run performance is indicated by receiving a GO on each performance construct falling within that area. (The measures and standards used to evaluate each construct within each mission and phase appear in Tables 4 and 5.) The manner in which the separate constructs contribute to each aspect of performance is shown in Tables 6 and 7. The standard for qualification is stringent. A NO GO on any constituent performance construct results in a NO GO for the more general aspect of platoon performance.

Many of the constructs, depending upon the particular battle run facility, will come into play several times during the course of the test (e.g., prioritization of threat targets). In these cases a GO in Table 6 or 7 must be based on some proportion of GOs for the construct in question. This value, which can be arbitrarily chosen should be reasonably demanding. For example, the following criteria might be employed:

No. of Occasions	% at Standard to Receive a GO
1	100%
2	100%
3	100%
4	75%
5	80%

The general rule might be that the standard be met at least 70% of the time.

Table 6
Aggregation of Offensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
FACET 1 - PREPARATION AND PLANNING		
Phase I - Preparation and Planning		
P Maintenance of Integrity		
P Intraplatoon Communication		
P Preparation for Operation		
PL Command & Control of Forces		
PL Completeness of Warning Order		
PL Timeliness of Warning Order		
PL Planning of Operation		
PL Location of OPORD		
PL Timeliness of OPORD		
PL Completeness of OPORD		
Phase IV - Consolidation and Reorganization		
P Intraplatoon Communication		
P Redistribution of Ammunition		
FACET 2 - TECHNIQUES OF MOVEMENT		
Phase I - Preparation and Planning		
P Maintenance of Integrity		
P Dispersion		
P Tactical Deployment		
P Tactical Formation		
SL Command & Control of Forces		
PL Control of Movement		
Phase II - Movement to Contact		
BS Maintenance of Integrity		
BS Dispersion		
BSL Command & Control of Forces		
PL Control of Movement		
BSL Control of Movement		
OWSL Assignment of Sectors of Observation		
OWSL Assignment of Sectors of Fire		
PL Effectiveness of OW Position		
PL Designation of Next OW Position		
Phase III - Assault		
S Maintenance of Integrity		
P Dispersion		
P Tactical Formation		
PL Command & Control of Forces		
SL Command & Control of Forces		
SL Control of Movement		
P Sweeps Objective		
PL Assignment of Sectors of Observation		
PL Assignment of Sectors of Fire		

Table 6 (cont'd.)
Aggregation of Offensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
FACET 3 - USE OF TERRAIN		
Phase I - Preparation and Planning		
P Use of Covered Routes		
P Use of Concealed Routes		
P Speed of Movement in Open Areas		
Phase II - Movement to Contact		
OWS Reduction of Vulnerability		
BS Reduction of Vulnerability		
BS Use of Covered Routes		
BS Speed of Movement in Open Areas		
BS Rate of Movement to New OW		
PL Designation of a Covered Route		
PL Designation of a Concealed Route		
Phase III - Assault		
P Reduction of Vulnerability		
P Use of Covered Routes		
P Use of Concealed Routes		
P Speed of Movement in Open Areas		
PL Designation of a Covered Route		
PL Designation of a Concealed Route		
P Skylining		
P Rate of Assault		
PL Designation of Assault Position		
FACET 4 - FIRE AND MANEUVER		
BS Reconnaissance by Fire		
OWSL Control of Suppressive Fire		
FACET 5 - DISTRIBUTION OF PLATOON FIRE		
Phase II - Movement to Contact		
OWS Pattern of Fire		
BS Pattern of Fire		
OWS Distribution of Fire		
BS Distribution of Fire		
BSL Unit Fire Command		
OWSL Unit Fire Command		
Phase III - Assault		
P Pattern of Fire		
P Distribution of Fire		
PL Fire Command		

Table 6 (cont'd.)
Aggregation of Offensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
FACET 6 - ENGAGEMENT OF MULTIPLE TARGETS		
Phase II - Movement to Contact		
P Target Acquisition		
BS Stabilized Gunnery		
OWS Target Prioritization		
BS Target Prioritization		
OWS Speed of Fire		
BS Speed of Fire		
BS Marking for Overwatch		
OWS Suppression of Targets		
BS Suppression of Targets		
OWS Target Neutralization		
BS Target Neutralization		
Phase III - Assault		
P Stabilized Gunnery		
P Target Prioritization		
P Speed of Fire		
P Target Neutralization		
P Massing Fire Power		
FACET 7 - REPORTING TECHNIQUES		
Phase I - Preparation and Planning		
P Visual Signalling		
Phase II - Movement to Contact		
P Visual Signalling		
PL Communication		
OWSL Communication		
BSL Communication		
PL Spot Report		
Phase II - Assault		
PL Communication		
PL Situation Report		
FACET 8 - SECURITY		
Phase I - Preparation and Planning		
P Reduction of Vulnerability		

Table 6 (cont'd.)
Aggregation of Offensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
Phase II - Movement to Contact		
P Reduction of Vulnerability	—	—
Phase III - Assault		
Closed Hatches	—	—
FACET 9 - ATGM COUNTERACTION DRILL	=	=
Phase II - Movement to Contact		
Bounding Tanks Duck	—	—
Bounding Tanks Dodge	—	—
Bounding Tanks Zig-Zag	—	—
Phase III - Assault		
Bounding Tanks Zig-Zag	—	—
FACET 10 - INDIRECT FIRE	=	=
Phase II - Movement to Contact		
OWSL Request for Indirect Fire	—	—
OWSL Adjust Indirect Fire	—	—
Phase III - Assault		
PL Request for Indirect Fire	—	—
PL Adjust Indirect Fire	—	—
PL Shift Indirect Fire	—	—

Table 7
Aggregation of Defensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
FACET 1 - PREPARATION AND PLANNING		
Phase I - Preparation and Traveling		
P Maintenance of Integrity		
Intraplatoon Communication - Platoon		
P Preparation for Operation		
PL Command & Control of Forces		
PL Completeness of Warning Order		
PL Timeliness of Warning Order		
PL Planning of Operation		
PL Location of OPORD		
PL Timeliness of OPORD		
PL Completeness of OPORD		
Phase II - Occupy Battle Position		
Intraplatoon Communication - Platoon		
Intraplatoon Communication - Platoon Leader		
P Preparation for Operation		
PL Planning of Operation		
FACET 2 - TECHNIQUES OF MOVEMENT		
Phase I - Preparation and Planning		
S Maintenance of Integrity		
P Speed of Movement in Open Areas		
P Dispersion		
PL Visual Signalling		
SL Visual Signalling		
PL Control of Movement		
Phase II - Occupy Battle Position		
Tank Reduction of Vulnerability		
Phase IV - Movement to Supplementary Position		
BS Maintenance of Integrity		
BS Speed of Movement in Open Areas		
BS Dispersion		
BS Visual Signalling		
PL Control of Movement		
BSL Control of Movement		
BSL Rate of Movement to New OW		

Table 7 (cont'd.)
Aggregation of Defensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
FACET 3 - USE OF TERRAIN	___	___
Phase I - Preparation and Traveling		
P Use of Covered Routes	___	___
P Use of Concealed Routes	___	___
Phase II - Occupy Battle Position		
PL Designation of a Covered Route	___	___
PL Designation of a Concealed Route	___	___
PL Selection of Unrestricted Positions	___	___
PL Selection of Covered & Concealed Positions	___	___
Phase III (and V) - Defense of Battle Position (and Supplemental Position)		
PL Control of Movement	___	___
Phase IV - Movement to Supplemental Position		
OW Section Reduction of Vulnerability	___	___
BS Use of Covered Routes	___	___
BS Use of Concealed Routes	___	___
FACET 4 - FIRE AND MANEUVER	___	___
Phase IV - Movement to Supplemental Position		
BS Rate of Movement to New OW	___	___
OWSL Assignment of Sectors of Observation	___	___
OWSL Assignment of Sectors of Fire	___	___
PL Effectiveness of OW Position	___	___
FACET 5 - DISTRIBUTION OF PLATOON FIRE	___	___
Phase III (and V) - Defense of Battle Position (and Supplemental Position)		
P Pattern of Fire	___	___
P Distribution of Fire	___	___
PL Unit Fire Command	___	___
Phase IV - Movement to Supplemental Position		
OW Section Unit Fire Command	___	___

Table 7 (cont'd.)
Aggregation of Defensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
FACET 6 - ENGAGEMENT OF MULTIPLE TARGETS		
Phase III (and V) - Defense of Battle Position (and Supplemental Position)		
P Target Acquisition		
P Use of IR Flicker		
P Target Prioritization		
P Speed of Fire		
P Target Neutralization		
PL Request Illumination		
Phase IV - Movement to Supplemental Position		
OWSL Control of Suppressive Fire		
FACET 7 - PROPER REPORTING TECHNIQUES		
Phase III (and V) - Defense of Battle Position (and Supplemental Position)		
PL Communication		
PL Spot Report		
Phase IV - Movement to Supplemental Position		
OWSL Communication		
FACET 8 - SECURITY		
Phase I - Preparation and Traveling		
P Reduction of Vulnerability		
Phase II - Occupy Battle Position		
P Reduction of Vulnerability		
Phase III (and V) - Defense of Battle Position (and Supplemental Position)		
P Closed Hatches in Response to Incoming Artillery		

Table 7 (cont'd.)
Aggregation of Defensive Performance Constructs
within Facets of Platoon Performance

	GO	NO GO
FACET 9 - INDIRECT FIRE		
Phase III (and V) - Defense of Battle Position (and Supplemental Position)		
PL Request for Indirect Fire		
PL Adjust Indirect Fire		
Phase IV - Movement to Supplemental Position		
OWSL Request for Indirect Fire		
OWSL Adjust Indirect Fire		

Aggregation for Diagnosis. While training diagnosis can and should be concerned with both proficiencies and deficiencies, assume for the moment that the latter are of particular concern to a training manager. In this case, when confronted with the data collected during a run through Table IX, he must address those measures on which performance was below training and/or combat standards. In one particular instance the diagnosis of the cause of the problem and the implications for future training might be direct and obvious (e.g., "the platoon wasted ammunition in servicing the multiple targets because the indicated cross-fire pattern was neither ordered nor used"). In other instances (e.g., where cross-fire was ordered and used but still too few targets were neutralized) the nature of the difficulty might be far less obvious. In such cases the diagnostic process would have to continue at a more microanalytic level of performance data (e.g., When cross-fire was applied did each gunner apply appropriate lead?).

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APPENDIX A

Scope of Battle Runs Defined by Component "Tasks"

APPENDIX A: SCOPE OF BATTLE RUNS DEFINED BY COMPONENT "TASKS"

As shown in Table A-1, in each of the six offensive Table IX's examined, the battle run is segmented into component parts for descriptive and/or scoring purposes. The descriptive bases used include: phases (two Table IX's, with four and five phases); tasks within phases (one Table IX comprised of two phases containing four and three tasks); tasks within performance objectives (one Table IX with two performance objectives based on five and three tasks); and tasks (two Table IX's containing 10 and five tasks). Components of the five defensive battle runs also vary widely. As shown in Table A-2 their descriptive bases include: phases (one Table IX with four phases); phases within a battle position (one Table IX with 10 phases distributed over two battle positions); tasks within performance objectives (one Table IX with three performance objectives consisting of two, three, and one task, respectively); and tasks (two Table IX's with 10 and 12 tasks).

Since the battle runs in Tables A-1 and A-2 are arranged from left to right in chronological order, one can see how terminology has evolved (e.g., from phases to tasks) and how the more recent Table IX's have increased in scope.

In both tables the "task" descriptive labels in the left-hand column have been arranged from top to bottom in a logical sequencing of activities. The first six labels in Table A-1 represent activities involved in planning and preparation for an offensive mission, beginning with the issuance of appropriate orders (e.g., Troop Leading Procedures) and ending when the platoon crosses the line of departure (e.g., Attack). The next 16 activities involve movement from the line of departure to contact with the enemy and reaction to the enemy threat. The third set of four labels concerns an assault upon an objective while the final three activities involve consolidation of the objective and/or preparation of a hasty defense. The battle runs do not explicitly address major mission operations, but from this analysis it is clear that the detailed labels can easily be grouped into categories of mission operations resembling those depicted in Figure 1.

The same is generally true for the defensive battle runs presented in Table A-2. While agreement is not perfect, especially with respect to defense from a supplemental battle position, most terms can be grouped into categories corresponding to major mission operations depicted in Figure 2. The first term, "Troop Leading Procedures," has been placed in the "Plan Defensive Operation" category. The next four terms involve the actual occupation of a

battle position. The next 13 describe activities involved in the defense of a battle position. These are followed by 12 labels having to do with displacement to a supplemental battle position. The next set of nine activities involves defense of the supplemental position while the final term, applying to only one of the battle runs, is concerned with reorganization.

Table A-1. DESCRIPTIONS AND SEGMENTS OF OFFENSIVE BATTLE RUNS

DESCRIPTIVE LABELS	SOURCES: FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
PLAN OFFENSIVE OPERATION	*	**		***	***			****		
Task-troop leading, procedures										'
Task-prepare to attack										
Task-prepare to attack, conduct precombat checks									'	
Task-cross the SP									'	
Task-move thru the attack position										
Task-attack									'	
CONDUCT MOVEMENT TO CONTACT & HASTY ATTACK										
Phase 1 - Movement from LD to contact		'	'							
Movement to contact phase						'				
Task-move to contact										'
Performance objective #1-task-platoon will move, conduct a recon by fire, make contact with threat security elements & take action on contact							'			
Phase 2 - continue to engage threat		'	'							
Phase 3 - continue to engage threat		'	'							
Task-employ movement techniques						'	'			
Task-reconnaissance by fire						'	'			
Task-employ fire & maneuver						'	'		'	
Task-maintain communications						'	'			
Task-react to enemy threat, employ movement techniques									'	

Table A-1. DESCRIPTIONS AND SEGMENTS OF OFFENSIVE BATTLE RUNS (cont'd.)

DESCRIPTIVE LABELS	SOURCES: FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
Task-engage threat targets on the move									'	
Task-platoon continues attack-reacts to threat									'	'
Phase 4-engage threat on objective			'							
Movement to objective phase						'				
Task-move to objective						'	'			
CONDUCT ASSAULT										
Phase 5-assault		'	'							
Performance objective #2-task-platoon will move & engage/ seize part of a threat rifle platoon (reinforced) strong point							'			
Intermediate task-assault							'			
Task-assault									'	
CONSOLIDATE AFTER AN ATTACK										
Task-occupy hasty position						'	'		'	
Task-hasty defense										'
Task-employ direct fire						'	'			

* The FM does not contain gunnery tables for the platoon, although it does contain a chapter on platoon distribution and control of fire.

** The platoon battle run is designated as Table X. Table IX is a section battle run that is virtually identical to the platoon run.

*** The platoon battle run exercises are graphically portrayed in Chapter 20, FM 17-12 (3/77) and fall within the five phases presented in that document. Each section (heavy and ligh carries out eight gunnery exercises.

**** Information on platoon battle runs is presented in supplements to this publication (i.e., DRAFT FM 17-12-2, Change 2).

Table A-2. DESCRIPTIONS AND SEGMENTS OF DEFENSIVE BATTLE RUNS

DESCRIPTIVE LABELS	SOURCES									
	FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
PLAN DEFENSIVE OPERATION	*	**		***	***			****		
Task: Troop leading procedures										•
OCCUPY SECTOR/BATTLE POSITION										
Task-conduct relief in place									•	
Task-occupy battle position									•	•
Performance objective #1- Task: occupy battle position							•			
Occupy phase						•				
DEFEND BATTLE POSITION										
Task: Identify & report OPFOR vehicles										•
Task: Withdraw security element										•
PHASE I			•							
Initial battle position: 1st engagement phase						•				
Task: Engage 2 threat tank co.									•	
Task: Engage 3 threat tank co.									•	
Performance objective #1 - Task: Employ direct fire							•			
Task: Engage OPFOR (long-range)										•
PHASE II			•							
Task: Engage OPFOR (mid-range)										•
Initial battle position: 2nd engagement phase						•				
Initial battle position: 3rd engagement phase						•				
Initial battle position: 4th engagement phase						•				

Table A-2. DESCRIPTIONS AND SEGMENTS OF DEFENSIVE BATTLE RUNS (cont'd.)

DESCRIPTIVE LABELS	SOURCES: FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
DISPLACE TO SUPPLEMENTARY BATTLE POSITION										
Initial battle position: Disengage phase						'				
Performance objective #2 - Task: Disengage, employ fire, maneuver							'			
Movement between battle position phase						'				
Performance objective #2 - Task: Move between battle positions							'			
Task: Move to subsequent battle position/employ coax while moving									'	
Task: Move to subsequent battle position/employ direct fire									'	
Task: Engage OPFOR (mid & short range) while moving										'
Task: Move to subsequent battle position									'	'
Performance objective #2 - Task: Maintain communications							'			
Task: Communicate										'
Phase III			'							
Phase IV			'							
DEFEND SUPPLEMENTARY BATTLE POSITION										
Subsequent battle position: 1st engagement phase						'				
Task: Engage threat while under chemical attack									'	

Table A-2. DESCRIPTIONS AND SEGMENTS OF DEFENSIVE BATTLE RUNS (cont'd.)

DESCRIPTIVE LABELS	SOURCES									
	FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
Task: Decontaminate									'	
Task: Engage OPFOR (close range)										'
Task: Defend from subsequent position										'
Performance objective #3 - Task: Employ direct fire							'			
Subsequent battle position: 2nd engagement phase						'				
Task: Engage 2 threat motorized rifle co. & dismounted troops									'	
Subsequent battle positions: 3rd engagement phase						'				
REORGANIZE AFTER A DEFENSE										
Task: Reorganize & replenish										'

* The FM does not contain gunnery tables for the platoon, although it does contain a chapter on platoon distribution and control of fire.

** The TC does not present a defensive battle run.

*** The platoon battle run exercises are graphically portrayed in Chapter 20, FM 17-12 (3/77) and fall within the four phases presented in that document. Each section (heavy and light) carries out three gunnery exercises.

**** Information on platoon battle runs is presented in supplements to this publication (i.e., DRAFT FM 17-12-2, Change 2).

APPENDIX B

Frequency of Target Types in Offensive and Defensive Battle Run Target Arrays

Table B-1. FREQUENCY OF TARGET TYPES IN OFFENSIVE BATTLE RUN TARGET ARRAYS*

TARGET ARRAYS	SOURCES										
	FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
I. ARRAYS CONTAINING A SINGLE TYPE OF TARGET	**		***					****		
a. SINGLE TARGET										
Anti-tank		1;1								
Tank		1;1		1;1,1	1,1;1	1	1			
Troops		1,1,1								
Truck		1								
b. TWO OR MORE TARGETS										
Anti-tanks				2;2	2;2					
ATGs						2				
ATGMs						2	2			
BMPs						2	2;2		2;2	2
HIND/HIPs				2;2	2;2	2				2
Tanks				[illegible]	[illegible]				2	[illegible]
Troops				[illegible]	[illegible]					

*The numbers in the body of the table represent the frequency of each target type. Semicolons separate different arrays in a battle run that contain the same target type, and commas separate target types within the same array. For example "3;2" represents two different arrays containing 3 and 2, respectively, of the same type of target; however, "3,2" represent one array with 3 of the first type of target and 2 of the second type of target. Brackets show the order of frequency when all targets in an array are not presented simultaneously. Thus, 3,5 $\begin{bmatrix}3,3\\0,2\end{bmatrix}$ represents the presentation of 3 of target type I and 3 of target type II, followed by 2 of target type II, for a total of 3 of target I and 5 of target II.

Table B-1. FREQUENCY OF TARGET TYPES IN OFFENSIVE BATTLE RUN TARGET ARRAYS (cont'd.)

TARGET ARRAYS	SOURCES										
	FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
II. ARRAYS CONTAINING MULTIPLE TYPES OF TARGETS										
ATGM, BMP										
ATGM, BRDM										
BRDM, HIND										
Infantry, PPG positions										
Rifle squad, tank										
Tank, troops										
ATGM, tank, troops										
HIND, tank, troops										
III. SCREENING & SUPPRESSION										
Self screen										
Area suppression										

** The FM does not present tables for the platoon, although it does contain a chapter on platoon distribution and control of fire.

*** Specific target arrays are described in FM 17-12-2 (3/77).

**** Specific target arrays are described in FM 17-12-2, Change 2, DRAFT (8/78).

Table B-2 FREQUENCY OF TARGET TYPES IN DEFENSIVE BATTLE RUN TARGET ARRAYS*

TARGET ARRAYS	SOURCES: FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
I. ARRAYS CONTAINING A SINGLE TYPE OF TARGET	**	***						****	*****	*****
a. Single target										
b. Two or more targets										
BMPs						3;4;5				
Tanks			5;7	7	7	5	3		10;10;	10;10;
II. ARRAYS CONTAINING MULTIPLE TYPES OF TARGET										
Anti-tank, tank				3,5 [3,3 0,2]	3,5 [3,3 0,2]					
BMP, anti-tank			3,1							
BMP, SP gun							5,1			
BMP, tank						9,1; 8,2; 5,3; 2,5	3,1; 4,1; 6,1; 5,3			
Rifle squad, tank			4,3							

*The numbers in the body of the table represent the frequency of each target type. Semicolons separate arrays containing the same weapon type in a battle run, and commas separate weapon types within the same array. For example "3;2" represents two different arrays containing 3 and 2, respectively, of the same type of weapon; however, "3,2" represents one array with 3 of the first type of weapon and 2 of the second type of weapon. Brackets show the order of frequency when all weapons in an array are not presented ismultaneously. Thus, 3,5 [3,3 0,2] represents the presentation of 3 of weapon type I and 3 of weapon type II, followed by 2 of weapon type II, for a total of 3 of weapon I and 5 of weapon II.

Table B-2. FREQUENCY OF TARGET TYPES IN DEFENSIVE BATTLE RUN TARGET ARRAYS (cont'd.)

TARGET ARRAYS	SOURCES									
	FM 17-12 11/72	TC 17-12-5 9/75	FM 17-12 3/77	FM 17-12-2 3/77	FM 17-12-4 3/77	FM 17-12-1 DRAFT 2/78	FM 17-12-1 DRAFT 5/78	FM 17-12 CHANGE 2 DRAFT 8/78	FM 17-12-2 CHANGE 2 DRAFT 8/78	ARTEP 71-2 DRAFT 12/78
BMP, tank, troops									[illegible]	
BMP, tank, SP gun							6, 4, 2			
BMP, tank, ZSU 23-4							5, 3, 2			
Anti-tank, BMP, rifle squad, tank				1, 3, 4, 3	1, 3, 4, 3					
BMP, HIND, tank, troops										14, [illegible] 4, 5 6, 2, [illegible]

** The FM does not present tables for the platoon, although it does contain a chapter on platoon distribution and control of fire.

*** The TC does not present a defensive battle run.

**** Specific target arrays are described in FM 17-12-2, Change 2, DRAFT (8/78).

***** Battle runs are presented for both day and night in the manual. Only information from the night battle run is shown here.

APPENDIX C

Measurement Constructs

Measurement constructs explicitly or implicitly referred to in the various battle runs are listed in the following table. Given the missions, operations, "tasks" and target arrays described earlier in Appendixes A and B, the labels in the left-hand column of the appendix indicate what aspects of performance have been mentioned, presumably for evaluation and measurement.

A few constructs have not been included in the list because of their compound or amorphous nature. Examples include: "tactical application of maneuver with gunnery" (TC 17-12-5); "employ suppressive fires and maneuver using terrain to maximum advantage to destroy multiple targets in any tactical situation" (TC 17-12-5); "teamwork" (FM 17-12-1); and "platoon leader controls the forces of his platoon" (TC 17-12-5). Parenthetically, the last construct also serves as a performance measure which is scored on the basis of evaluator judgment.

A checkmark (✓) in a given column indicates that the construct is used in both the offensive and defensive platoon battle run. When this is not the case, the mission to which the construct applies is identified by entering "O" for offensive scenario or "D" for defensive scenario.

MEASUREMENT CONSTRUCTS	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Preparation & Planning - Offensive Mission					O	O
Platoon integrity maintained					O	
PL/PS conduct precombat checks					O	O
Crews & equipment were prepared for missions					O	O
Weapons						O
Vehicles						O
Radios						O
Men						O
PL issues order to key subordinates						O
PL issued OPORD					O	O
OPORD contained all essential elements					O	
OPORD to key subordinates						O
PL issues warning order						✓
Missions						✓
Critical times						✓
Instructions to ready platoon						✓
PL conducts recon & coordinates with FIST						O
Platoon is ready to move in 1 hour						O
Platoon crosses SP on time					O	
Platoon crosses LD on time			O		O	
Preparation & Planning - Defensive Mission						
PL conducts recon						D
PL coordinates with platoon on position						D
PL issues defense order to key subordinates						D
Platoon is ready to move in 2 hours						D
Occupy battle position			D		D	D
Platoon moves into position without hesitation					D	D
Platoon maintains signal & light discipline					D	
Disseminate intelligence						D
Establish security on arrival at BP					D	
Exchange range cards					D	
Prepare a platoon fire plan			D			
Covers all assigned TRPs					D	
Covers all assigned sectors					D	
Cover avenues of approach						
Select P, A & S positions						
PL recon S BP J						
PL selects routes to subseq. BP for platoon			D			

MEASUREMENT CONSTRUCTS	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
PL briefs platoon					D	
Target servicing					D	
Movement to subsequent BP					D	
Occupation complete in time limit			D		D	D
Techniques of Movement	✓	✓	O	✓	✓	
Platoon conducted tactical movement to the SP						O
Platoon occupies position using appropriate formation enroute						D
Platoon deployed					O	O
Move by sections		✓				
Move as rapidly between engagements as tactical situation permits		✓	✓			
Sections move at 30 kph+			✓			
Platoon leader controls movement			O		D	
Platoon continues to advance					O	
All vehicles continue to move in the assault			O			
Dispersion of tasks in the assault	✓	✓				
Use of Terrain				✓	✓	
Platoon leader proficiency in moving his platoon using the terrain	✓					
Choose route best supporting mission		✓	D			
Use covered routes		✓	D		D	O
Use concealed routes		✓	D		D	O
Occupation of individual tank position	✓		✓		✓	
Provides 360° observation	✓					
Provides unrestricted field of fire	✓		✓			
Hull-down or turret down if possible	✓	✓	O		✓	D
Speed of occupation	✓					
Select at least one alternate pos. per tank					D	
Return to defilade after firing			D			
Move between primary & alternate positions		D	D		D	
Move to subsequent BP			D	✓	D	D
Bounding element moves promptly to cover						O
Tactical use of self-screening smoke	✓		D			
Effectiveness	✓					

MEASUREMENT CONSTRUCTS	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Smoke covers all crews			D			
Disengage with smoke screen			D			
Fire only when obscured			D			
Speed	✓					
Fire & Maneuver	✓	✓	✓	✓	✓	
Set up overwatch & bounding elements					O	
Sections mutually support with overwatch			O			✓
Use overwatch fires		✓			O	O
Use bounding fires						O
Bounding					O	
Support by fire			O			
Engagement of Multiple Targets	✓	✓	✓	✓	✓	✓
Detect & engage all visible threat targets			O			
Engage in priority of danger	✓	✓		✓		
Engage with appropriate weapon	✓	✓				
Main gun speed of engagement	✓	✓	✓	✓	✓	✓
Battlesight speed	✓					
Precision speed	✓					
Adjusted platoon battlesight speed		✓				
Adjusted platoon precision speed		✓				
Service array within time limit			✓	✓	✓	✓
Main gun accuracy (direct fire)	✓	✓	✓	✓	✓	✓
Machinegun speed of engagement	✓	✓	O	✓	✓	✓
Machinegun opening time	✓	✓				
Service array within time limit			O	✓	✓	✓
Machinegun target effect	✓	✓	O	✓	✓	✓
Area target	✓	✓	O	✓	✓	✓
Point target	✓	✓		✓		✓
Suppression	✓	✓	O			O
Accuracy of suppression	✓	✓	O			O
Rate of fire	✓	✓				
Coverage	✓	✓				
Machinegun technique of fire	✓	✓		✓		
Area target	✓	✓		✓		
Z-pattern	✓	✓		✓		
Walk into target	✓	✓		✓		

MEASUREMENT CONSTRUCTS	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Moving point target	✓	✓		✓		
Steady tracer stream into target	✓	✓		✓		
Steady lead	✓	✓		✓		
Proper rate of fire	✓	✓		✓		
Static point target	✓	✓		✓		
Proper adjustment	✓	✓		✓		
Correct rate of fire	✓	✓		✓		
Suppressive fire	✓	✓				
Correct rate of fire	✓	✓				
Correct length of fire	✓	✓				
Engage outnumbered			✓			
Engage threat at long range			D			
Engage under NBC conditions			D		D	
Prepare vehicle for NBC attack					D	
Employ weapons while masked					D	
Distribution of Platoon Fires	✓	✓	✓	✓	✓	
Control of platoon fires	✓	✓	✓	✓	✓	
Platoon leader proficiency in distributing his main gun fires	✓	✓				
Pattern of fire		✓				
Engage targets according to unit SOP			O	✓		
Shift suppressive fire	✓	✓				
Speed of shifting suppressive fire	✓	✓				
Conservation of ammunition	✓	✓				
Use of Proper Reporting Techniques				✓	✓	
Maintain communications			✓			
Spot reports on all enemy contact						
to higher unit			✓			O
in unit SOP			✓			
including enemy location			O			
Use proper RTP			✓			
Send status reports			D			
Incoming artillery fire						O
Promptly at opening & close of engmt.						O
At beginning & end of displacement						O
Use correct CEOI			D			

MEASUREMENT CONSTRUCTS	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Miscellaneous						
Provide illumination						
PL controls mortar/artillery illum.	✓				D	D
PL use of his own searchlight	✓					
Use passive/IR					D	
Supporting fires						
PL calls for supporting fires		✓		✓		D
Control indirect and other fires				✓	D	D
Use indirect and other fires					D	
Use during displacement					D	
OW shifts fire for suppres./obscur.					D	✓
Close hatches incoming artillery					D	D
Close hatches in assault					O	O
React to threat		✓				
Moves objective		✓				
Assault objective		✓				
Occupy hasty position		✓			O	
Consolidation procedures					O	
Redistribute ammunition					O	

APPENDIX D

Performance Measures

Performance measures implicitly or explicitly associated with the various battle runs are presented in the accompanying table. When a measure is used in both an offensive and defensive scenario a checkmark (✓) is entered in the appropriate column. When the measure applies to one or the other, this fact is duly noted by entering "O" for offensive scenario or "D" for defensive scenario.

PERFORMANCE MEASURES	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Preparation and Planning - Offensive Mission						
Platoon integrity maintained in assembly area					O	
Platoon leader/platoon sergeant conducted precombat checks (weapons, radios, vehicles, men)					O	O
Crews & equipment were prepared for mission (no uncorrected faults)					O	O
Platoon leader issued OPORD					O	
OPORD contained all essential elements					O	
Platoon crosses the SP on time					O	
Platoon crosses the LD on time					O	O
Platoon leader issues warning order stating mission, critical times, instructions to key subs						
Platoon leader conducts reconnaissance and coordinates with FIST						O
Time in minutes before platoon is ready to move						
Preparation and Planning - Defensive Mission						
Platoon established security upon arrival at the BP					D	
Time in minutes to:						
occupy hull down primary positions		D	D		D	
select at least one alternate position per tank			D		D	D
close fields of fire			D			
prepare a platoon fire plan covering all assigned TRPs, sectors			D		D	D
exchange range cards					D	
cover avenues of approach			D			
improve concealment as feasible						D
rehearse target servicing						D
Platoon leader conducts recon & coordinates with platoon on position						D
Platoon moves into position without hesitation, using appropriate formation(s) enroute & preserving signal & light discipline						D
Platoon disseminates intelligence						D

PERFORMANCE MEASURES	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Time in minutes that platoon is ready for action						D
Platoon leader makes tentative plan based on team order & a map recon						D
Platoon leader coordinates any changes with the CTC						D
Platoon leader plans movement to subsequent position						D
Select routes			D			
Recon subsequent positions			D			
Platoon leader briefs platoon on target servicing & movement to subsequent BP's					D	
Techniques of Movement						
A tank exposes its flank to a target (cut points)						
Use of proper techniques of movement (subjective evaluation)		C	O		D	
The platoon moves rapidly between engagements as the tactical situation permits (S.E.)			O			
Platoon leader controls movement			O			
Rate of section movement in kph (30 kph+)			O			
All vehicles continue to move in the assault			O		O	
Platoon uses overwatch and displaces by sections						D
Platoon moves from attack position deployed						O
Platoon movement technique and use of terrain (S.E.)					O	
Platoon conducts tactical movement to the SP					O	
Platoon deploys at the SP					O	
Degree of confusion or hesitation during displacement					D	

PERFORMANCE MEASURES	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Use of Terrain						
Time to self-screen with smoke (seconds - points)	✓					
Effectiveness of self-screening smoke (subjective evaluation)	✓		D			D
Extent to which a tank is obscured by smoke when it fires			D			
Rate of movement when an unobscured tank fires			D			
Time to occupy a firing position by each crew (seconds)	✓					
Degree to which tank is in a hull-down or turret down position if possible (S.E.)	✓	✓	O		✓	D
Degrees of observation provided by each fighting position (360°)	✓					
Degree of restriction in each tank's field of fire	✓					
Amount of cover and concealment provided by routes used (S.E.)		✓				
Degree to which the route chosen supports the maneuver		O	D			
Time for crews to return to defilade positions after firing (seconds)			D			
Platoon leader issues order to displace to subsequent BP						D
Platoon displaces to subsequent BP over previously selected routes and occupies BP					D	
Effectiveness of use of terrain (subjective evaluation)					D	
Employ direct fire from primary and alternate positions					D	
Number of engagements fired from one position						D

PERFORMANCE MEASURES	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Engagement of Multiple Targets						
Time to hit main gun battlesight target(s) (seconds → points)	✓					
Time to hit main gun precision target(s) (seconds → points)	✓					
Time to hit main gun battlesight target(s)/no. of targets/no. of tanks (seconds → points)		✓				
Time to hit main gun precision target(s)/no. of targets/no. of tanks (seconds → points)		✓				
Time to hit main gun target(s) in array (seconds vs. time limit)			✓		✓	✓
Number of main gun battlesight targets in array hit (→ points)		✓				
Number of main gun precision targets in array hit (→ points)		✓				
Number of main gun targets in array hit (#, %)			✓		✓	✓
Time to achieve effect on machinegun targets (seconds → points; vs. time limit)	✓	✓	O		✓	✓
Machinegun area target effect (fourths or fifths of target coverage)	✓	✓	O		✓	✓
Machinegun point target effect (one or more traces through target)	✓	O				✓
Machinegun suppressive fire effect (accuracy, rate of fire, area coverage)	✓	O	O			O
Machinegun area target technique of fire (Z-pattern, walking tracer stream)	✓	✓				
Machinegun moving point target technique of fire (steady stream, steady lead, rate)	✓					
Machinegun stationary point target technique of fire (adjustment, rate)	✓	O				
Machinegun suppressive technique of fire (10- to 15-rounds bursts every 5-10 secs. for 1 min.)	✓	O				
Number of visible threat targets detected and engaged (100%)			O			

PERFORMANCE MEASURES	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Fire and Maneuver						
Sections mutually support with overwatch			O			
Platoon moves from attack position with a section in overwatch						O
Platoon sets up overwatch and bounding elements					O	
One section fires from overwatch while the other maneuvers					O	
Bounding (subjective evaluation)						
Distribution of Platoon Fires						
Number of tanks shooting at same target (more than one → cut points)	√					
Number of unexpended main gun rounds (→ points, 0 → cut points)	√	√				
Number of unexpended machinegun rounds (0 → cut points)	√					
Effectiveness of control of main gun fire (subjective evaluation)		√				
Control of fire (subjective evaluation)					√	
Use of Proper Reporting Techniques						
Transmit spot report on all enemy contact to higher unit in unit SOP format			O			
Location of enemy must be included in spot report			O			
Use of proper radiotelephone procedures			O			
Send spot and status reports using correct unit SOP, RTP, and CEOI (S.E.)			D		√	O
Platoon reports incoming fire						D
Platoon reports promptly on opening and close of engagement						D
Platoon reports on beginning and execution of displacement order					D	
Communications discipline maintained					D	
Reports to CTC correct OPFOR AFV identification, location, and time of sighting						D
Platoon communicates as appropriate by wire, visual signals, radio						D

PERFORMANCE MEASURES	TC 17-12-5 (1975)	FM 17-12 FM 17-12-2 FM 17-12-4 (1977)	Draft FM 17-12-1 (5/78)	Draft FM 17-12 Change 2 (1978)	Draft FM 17-12-2 Change 2 (1978)	Draft ARTEP 71-2 (1978)
Miscellaneous						
Platoon leader's performance in controling the forces of his platoon						
Control of indirect and other fires (subjective evaluation)						
Use of indirect and other fire during displacement					D	
Maintain command (subjective evaluation)					D	
Prepare vehicles for NBC attack					D	
Employ weapons while masked					D	
Close hatches						
Employ indirect flare illumination					D	
Passive/IR (subjective evaluation)					D	
Consolidate position					O	
Redistribute ammunition					O	
Request indirect fire and illumination						D
Platoon calls for indirect fire to suppress OPFOR (correct & complete call)						D
Platoon preserves light discipline					D	D
Platoon uses cover, concealment, suppression, and teamwork						O
Platoon shifts indirect fire to vicinity of target						O
Platoon loader hits target with indirect fire in three adjustments						D
Platoon masks on order and remains masked until all clear announced						D
Platoon opens hatches and sprays against contamination						D
Platoon, after testing, unmasks						D
Platoon reorganizes, maintains, resupplies & evacuates as required						D

APPENDIX E

OFFENSIVE AND DEFENSIVE INVERTED MISSION ANALYSES

MISSION: Attack north to vicinity of Grid 0088 and secure objective PAM. Be prepared to continue the attack (on order).

CONDITIONS:

ENEMY: Elements of motorized rifle regiment in hasty defensive positions vicinity north of phase line Bravo. Infantry, supported by tanks, digging in vicinity of Grid 0088.

FRIENDLY: First platoon, Company A, 5/22 Armor attack north to secure objective PAM.

FIRE SUPPORT: Brigade supported by 2/51 Arty (155SP) in general support. A-1, 5/22 has direct support by CSC mortar platoon and has priority of fire.

SERVICE SUPPORT: Class V resupply (ammunition) not available.

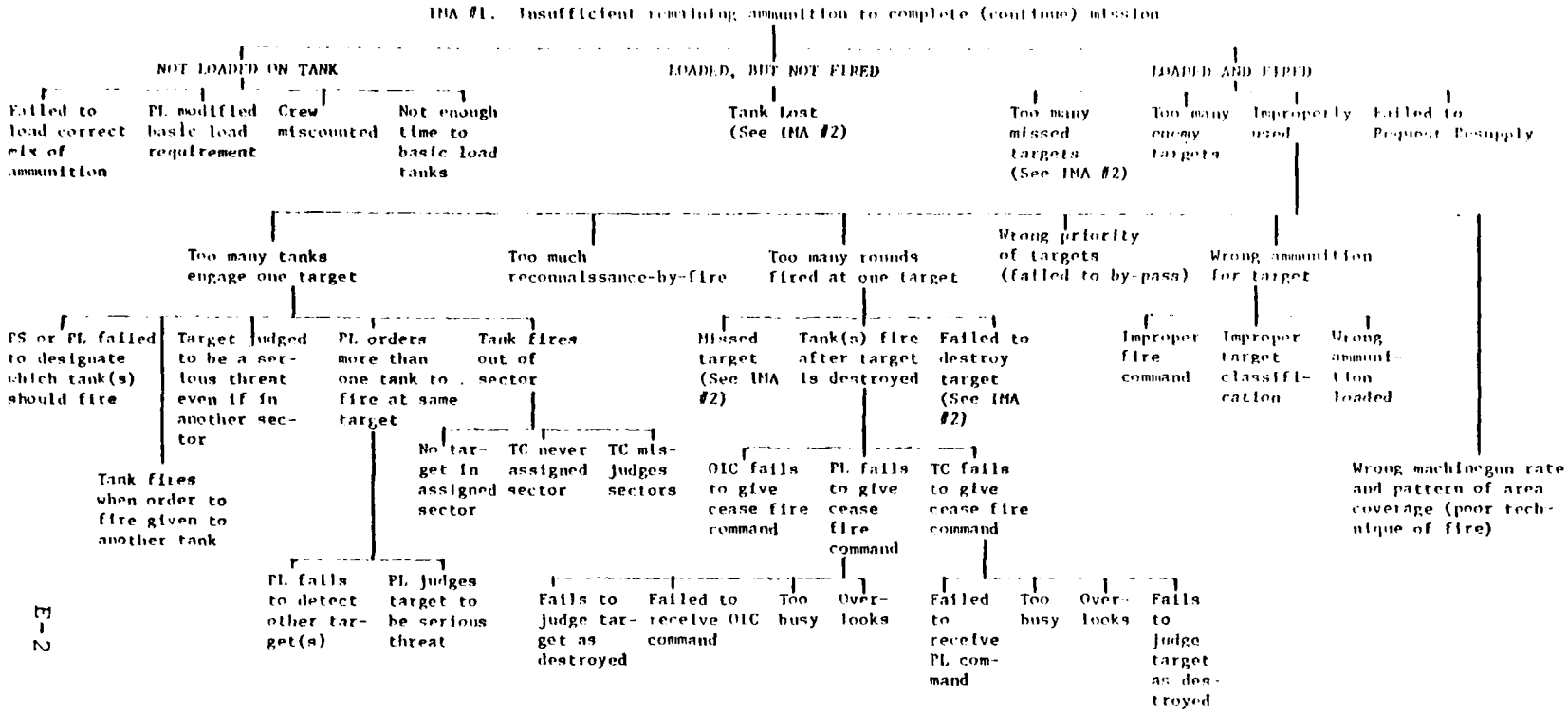
TERRAIN: Wooded and open; gullies.

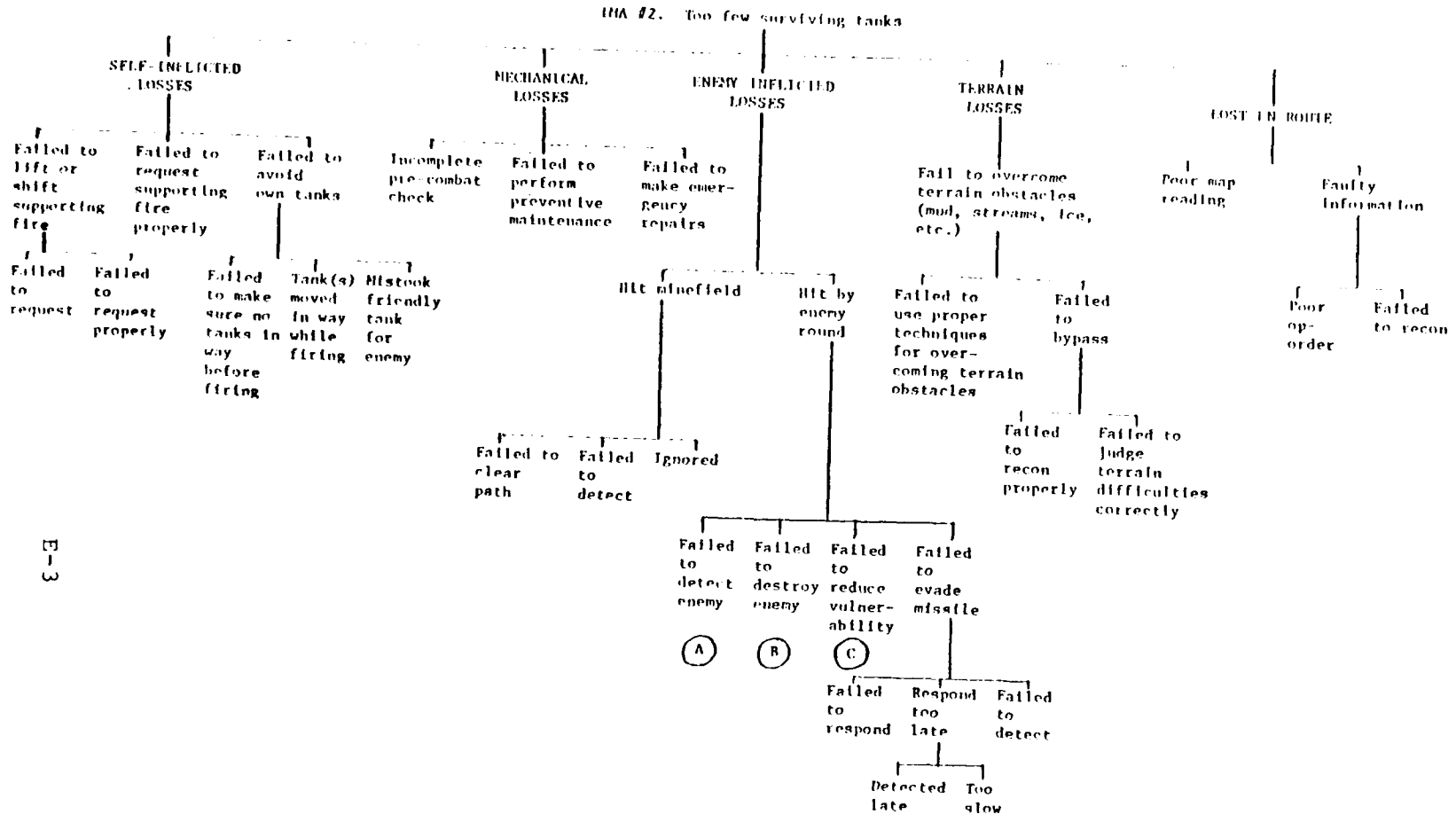
STANDARDS:

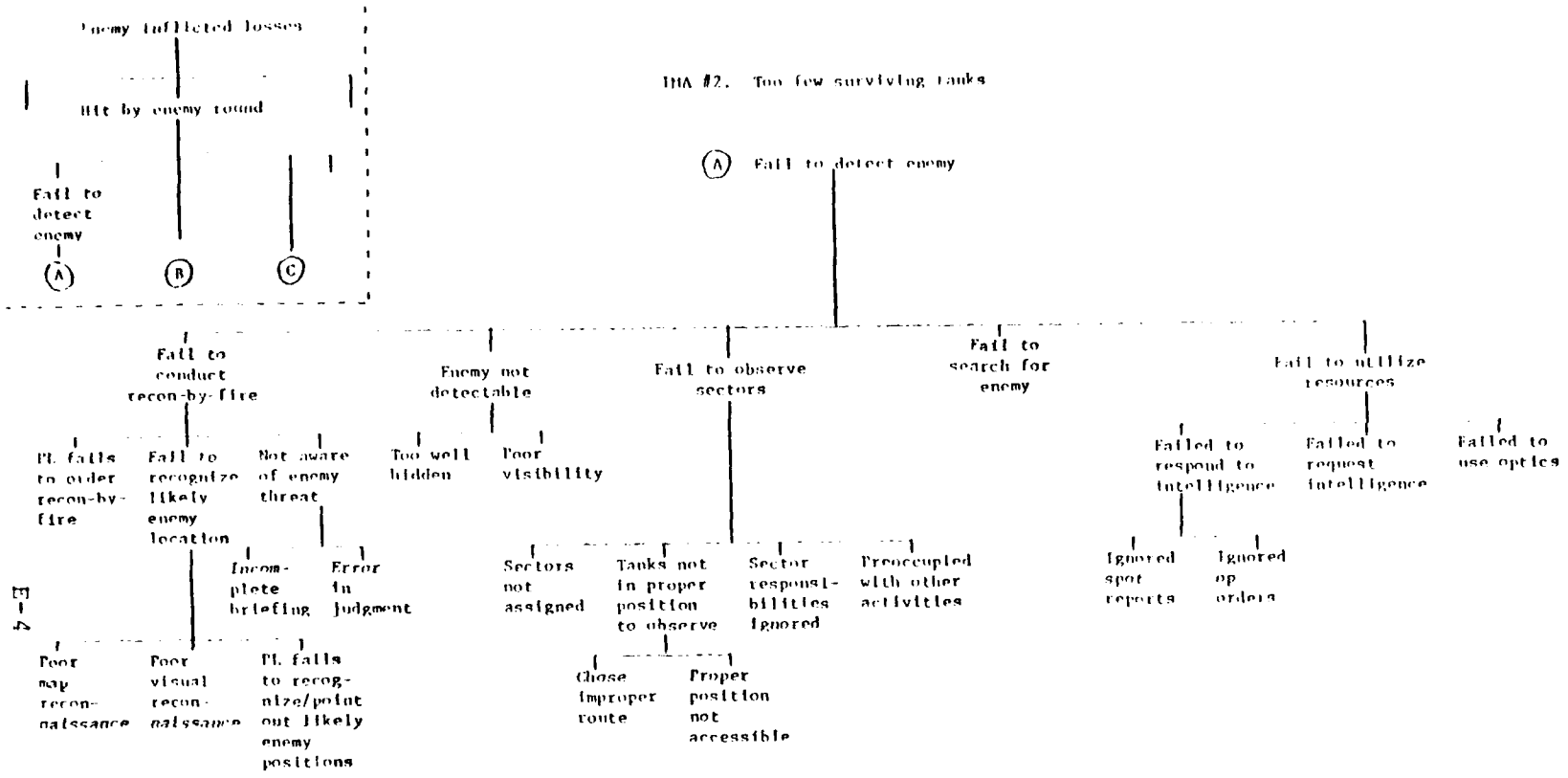
- Minimum of three operational tanks with full crews when objective is secured.
- Secure objective within one hour of crossing LD.
- Be able to continue attack within 30 minutes of securing objective.

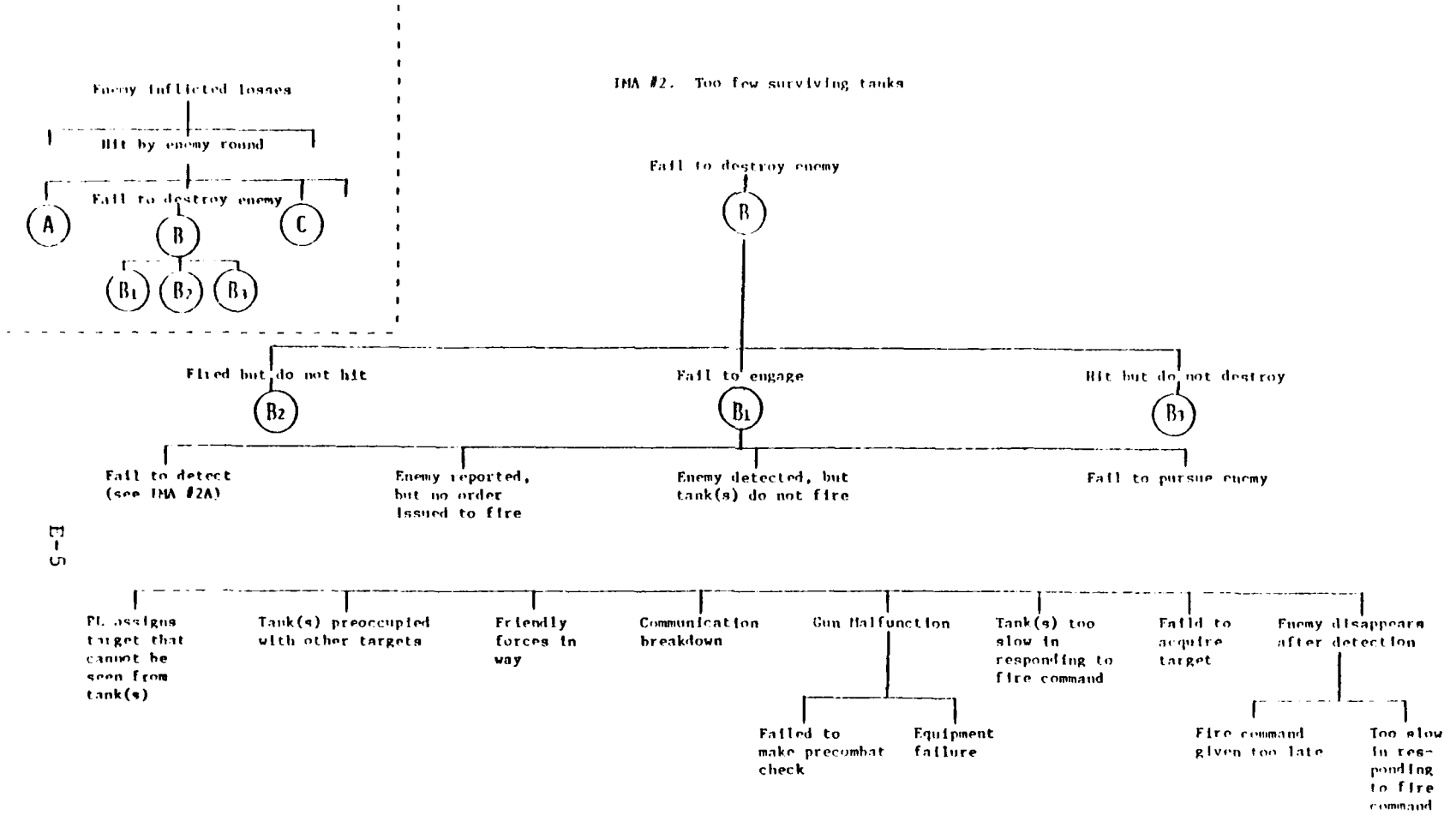
COMBAT FAILURE CRITERIA:

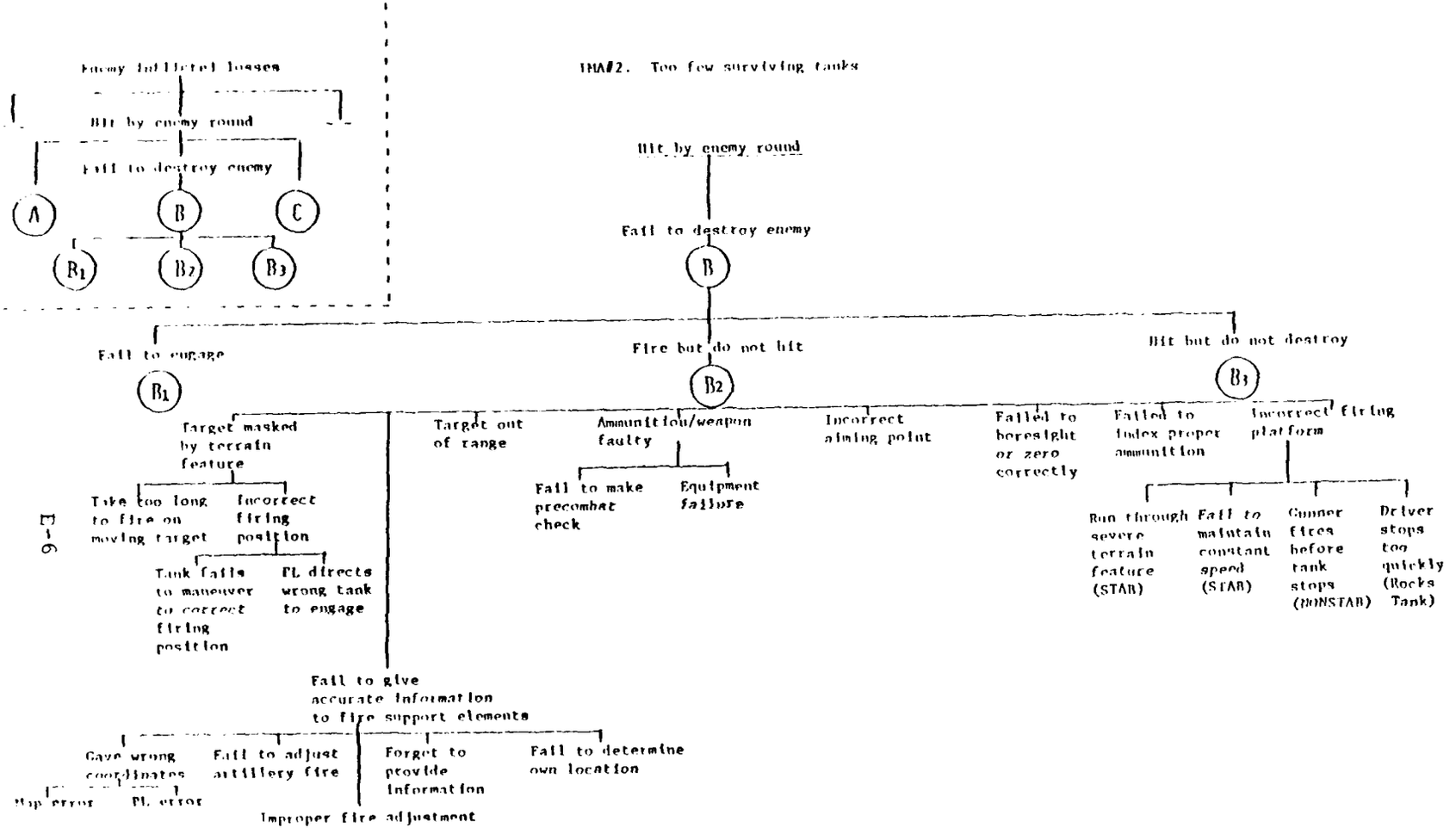
1. Insufficient remaining ammunition to complete (continue) mission.
2. Too few surviving tanks.
3. Secure objective too late.
4. Too few enemy destroyed.

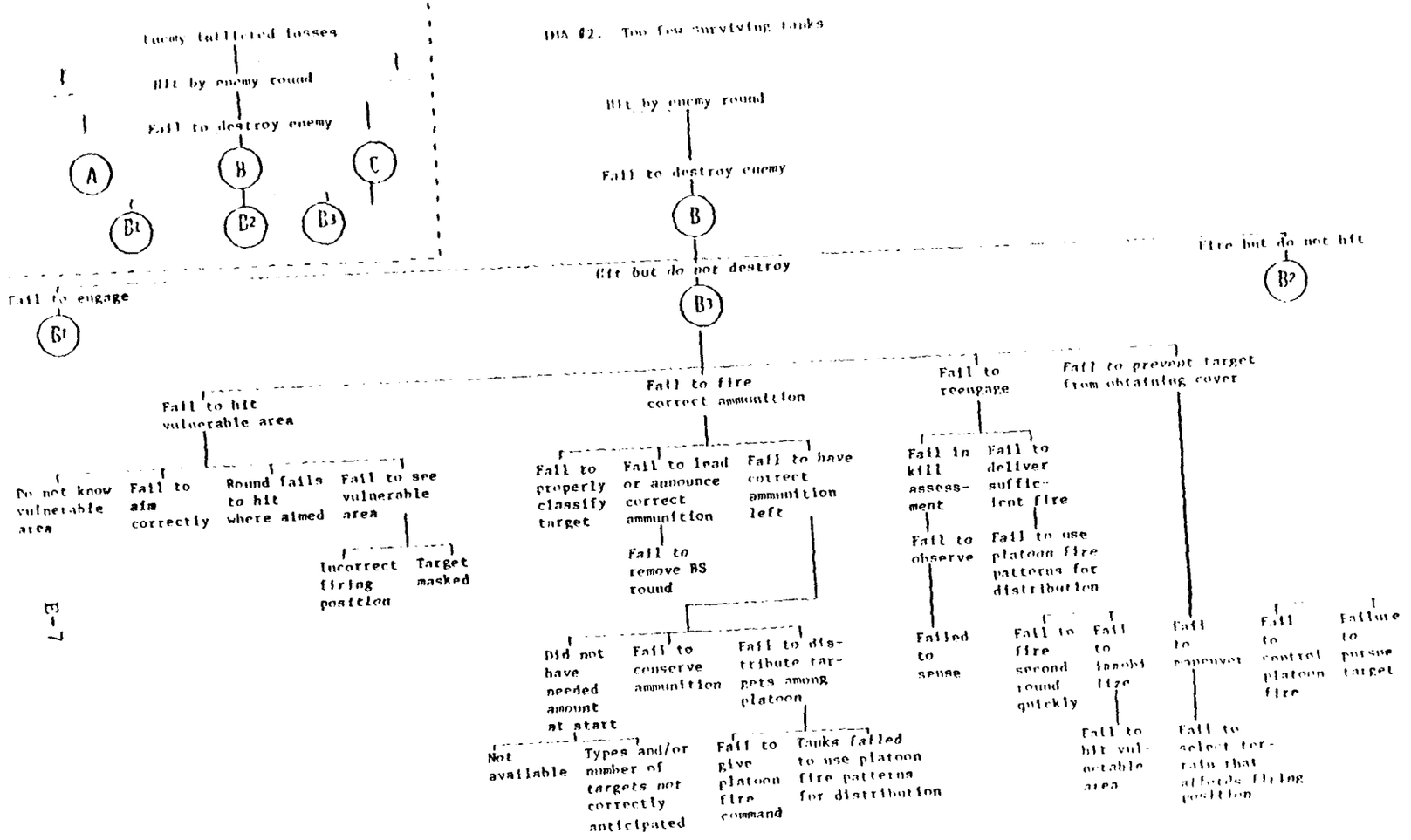

IMA #1. Insufficient remaining ammunition to complete (continue) mission
NOT LOADED ON TANK
LOADED, BUT NOT FIRED
LOADED AND FIRED
Failed to load correct mix of ammunition
PL modified basic load requirement
Crew miscounted
Not enough time to basic load tanks
Tank lost (See IMA #2)
Too many missed targets (See IMA #2)
Too many enemy targets
Improperly used
Failed to Request Resupply
Too many tanks engage one target
Too much reconnaissance-by-fire
Too many rounds fired at one target
Wrong priority of targets (failed to by-pass)
Wrong ammunition for target
FS or PL failed to designate which tank(s) should fire
Target judged to be a serious threat even if in another sector
PL orders more than one tank to fire at same target
Tank fires out of sector
Missed target (See IMA #2)
Tank(s) fire after target is destroyed
Failed to destroy target (See IMA #2)
Improper fire command
Improper target classification
Wrong ammunition loaded
Tank fires when order to fire given to another tank
No target in assigned sector
TC never assigned sector
TC misjudges sectors
OIC fails to give cease fire command
PL fails to give cease fire command
TC fails to give cease fire command
Wrong machinegun rate and pattern of area coverage (poor technique of fire)
PL fails to detect other target(s)
PL judges target to be serious threat
Fails to judge target as destroyed
Failed to receive OIC command
Too busy
Overlooks
Failed to receive PL command
Too busy
Overlooks
Fails to judge target as destroyed


THA #2. Too few surviving tanks
SELF-INFLICTED LOSSES
MECHANICAL LOSSES
ENEMY INFLICTED LOSSES
TERRAIN LOSSES
LOST IN ROUTE
Failed to lift or shift supporting fire
Failed to request supporting fire properly
Failed to avoid own tanks
Incomplete pre-combat check
Failed to perform preventive maintenance
Failed to make emergency repairs
Fail to overcome terrain obstacles (mud, streams, ice, etc.)
Poor map reading
Faulty information
Failed to request
Failed to request properly
Failed to make sure no tanks in way before firing
Tank(s) moved in way while firing
Mistook friendly tank for enemy
Poor op-order
Failed to recon
Hit minefield
Hit by enemy round
Failed to use proper techniques for over-coming terrain obstacles
Failed to bypass
Failed to clear path
Failed to detect
Ignored
Failed to recon properly
Failed to judge terrain difficulties correctly
Failed to detect enemy
Failed to destroy enemy
Failed to reduce vulner-ability
Failed to evade missile
A
B
C
Failed to respond
Respond too late
Failed to detect
Detected late
Too slow

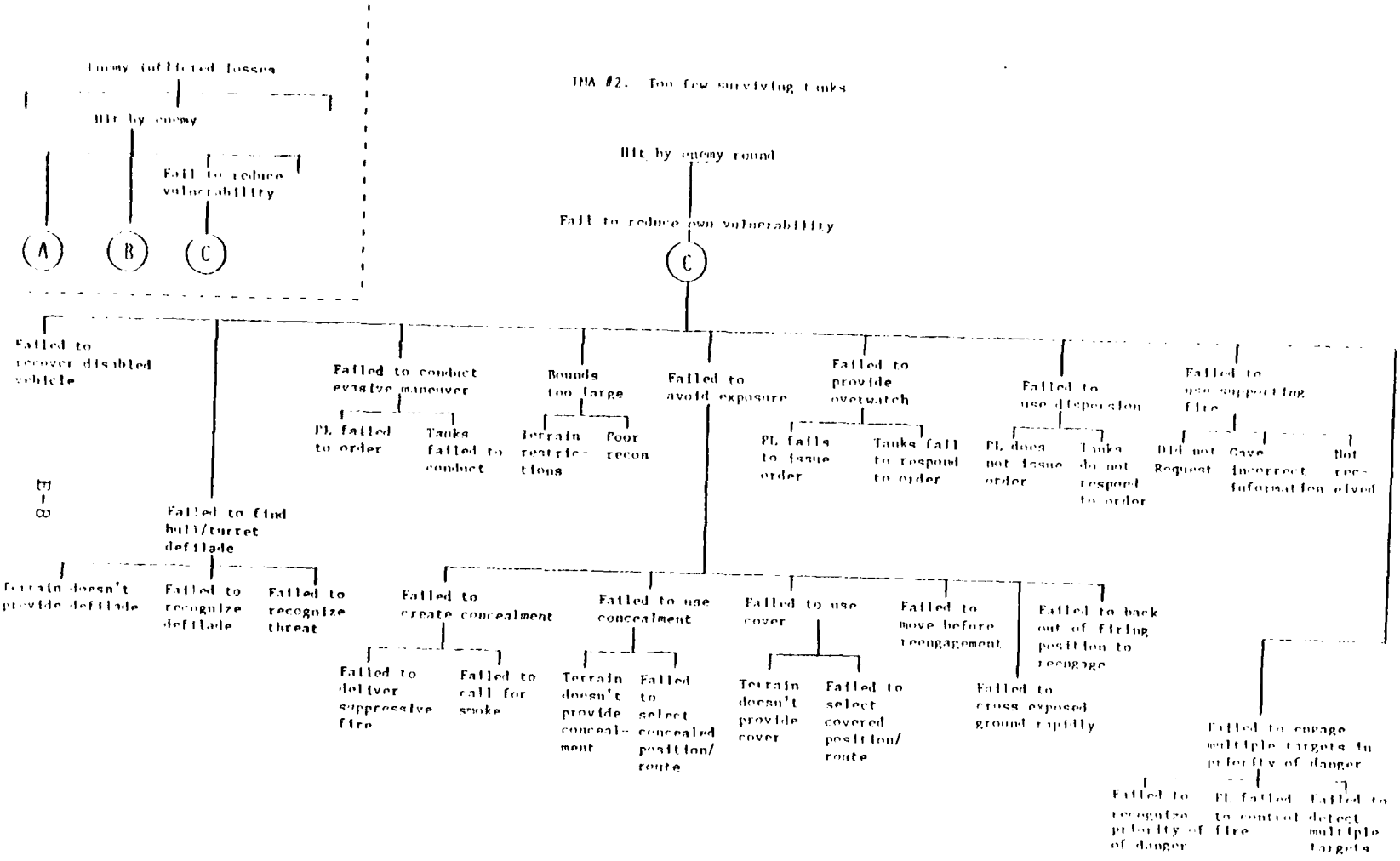

Enemy inflicted losses
Hit by enemy round
Fail to detect enemy
A
B
C
IHA #2. Too few surviving tanks
A Fail to detect enemy
Fail to conduct recon-by-fire
Enemy not detectable
Fail to observe sectors
Fail to search for enemy
Fail to utilize resources
Pl fails to order recon-by-fire
Fail to recognize likely enemy location
Not aware of enemy threat
Too well hidden
Poor visibility
Failed to respond to intelligence
Failed to request intelligence
Failed to use optics
Incom-plete briefing
Error in judgment
Sectors not assigned
Tanks not in proper position to observe
Sector responsi-bilities ignored
Preoccupied with other activities
Ignored spot reports
Ignored op orders
Poor map recon-naissance
Poor visual recon-naissance
Pl fails to recog-nize/point out likely enemy positions
Chose improper route
Proper position not accessible

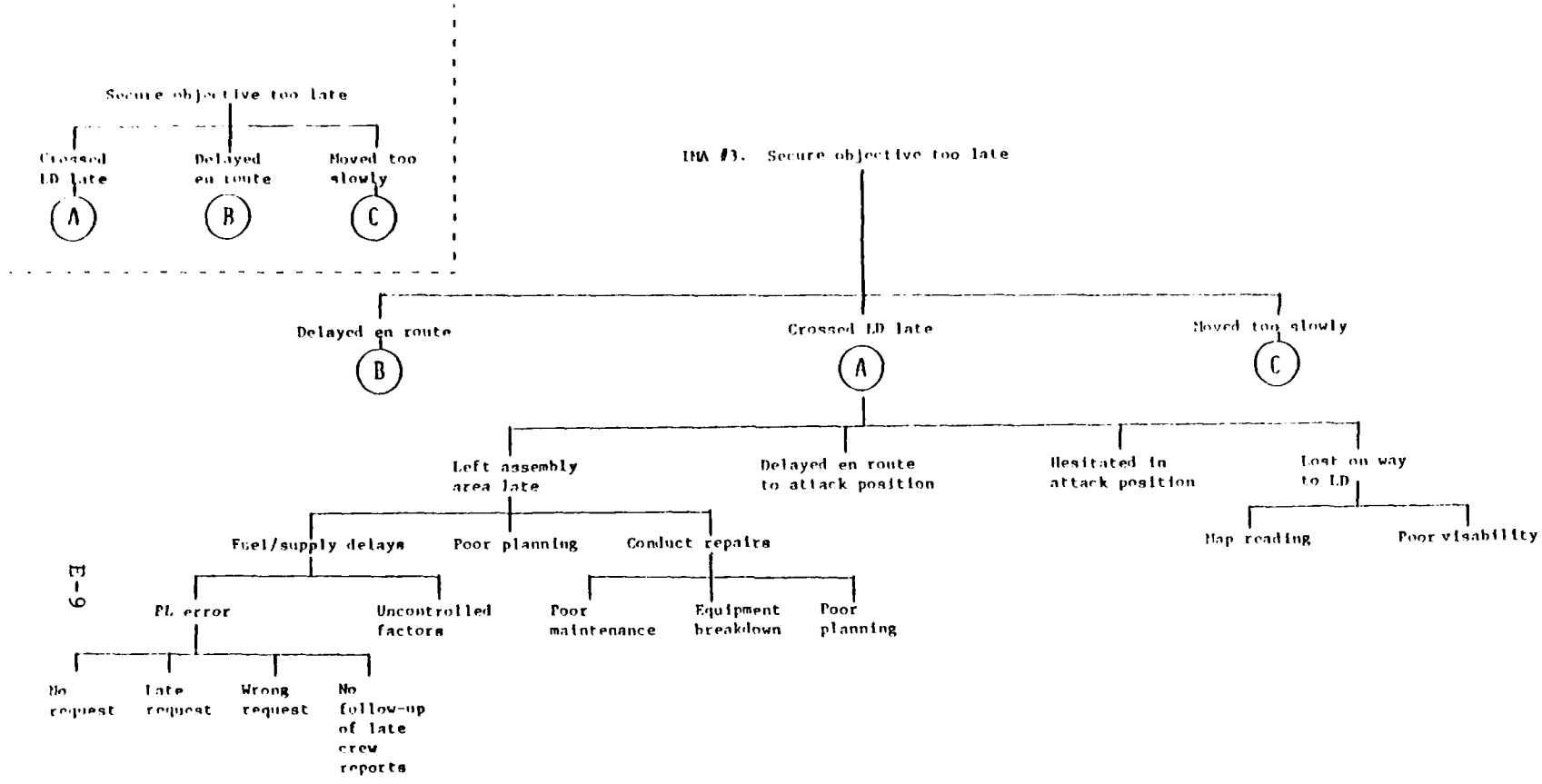

Enemy inflicted losses
Hit by enemy round
Fail to destroy enemy
A
B
C
B1
B2
B3
IMA #2. Too few surviving tanks
Fail to destroy enemy
B
Fired but do not hit
Fail to engage
Hit but do not destroy
B2
B1
B3
Fail to detect (see IMA #2A)
Enemy reported, but no order issued to fire
Enemy detected, but tank(s) do not fire
Fail to pursue enemy
PL assigns target that cannot be seen from tank(s)
Tank(s) preoccupied with other targets
Friendly forces in way
Communication breakdown
Gun Malfunction
Tank(s) too slow in responding to fire command
Fail to acquire target
Enemy disappears after detection
Failed to make precombat check
Equipment failure
Fire command given too late
Too slow in responding to fire command

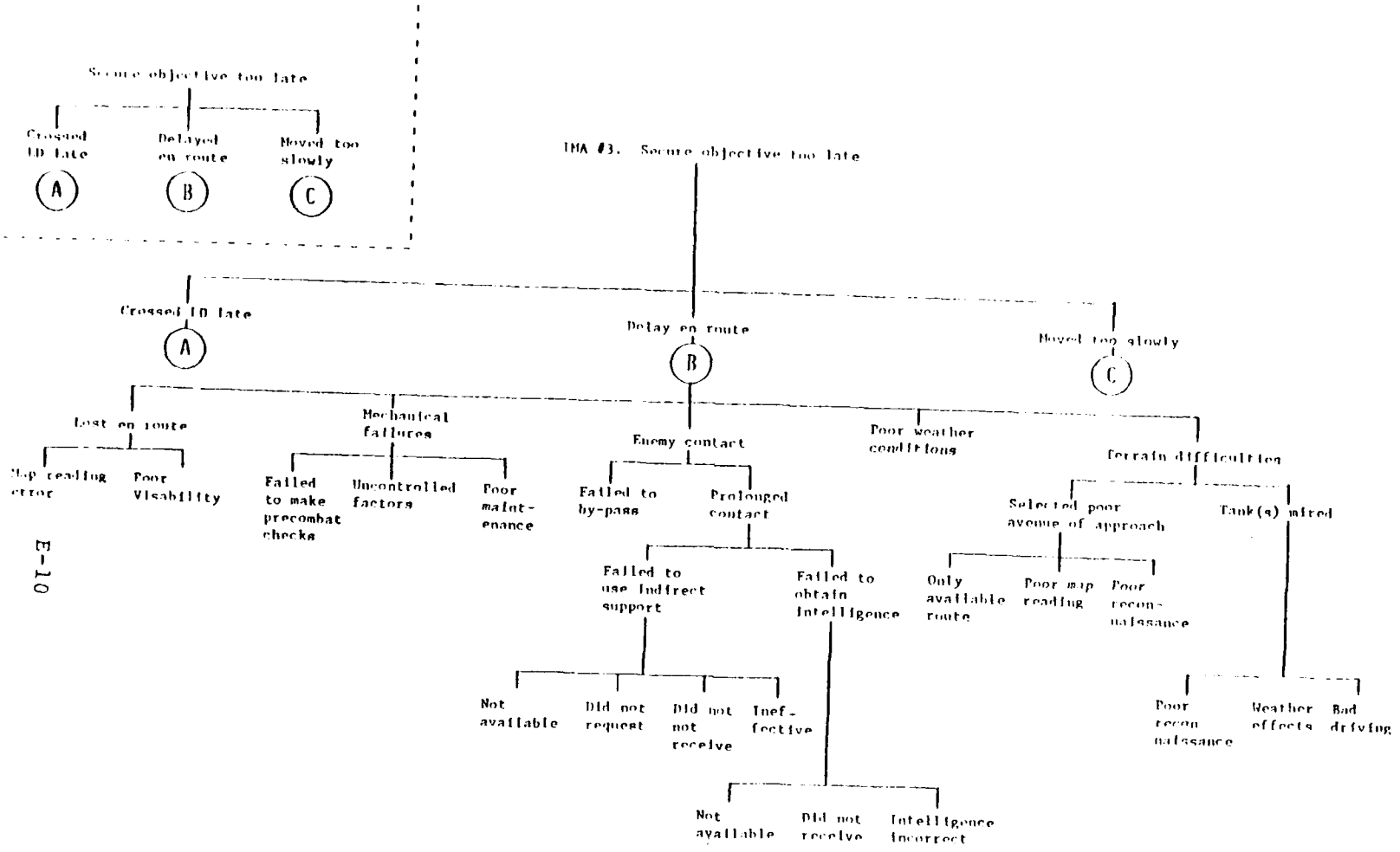

Enemy inflicted losses
Hit by enemy round
Fail to destroy enemy
A
B
C
B1
B2
B3
IMA#2. Too few surviving tanks
Hit by enemy round
Fail to destroy enemy
B
Fail to engage
B1
Fire but do not hit
B2
Hit but do not destroy
B3
Target masked by terrain feature
Take too long to fire on moving target
Incorrect firing position
Tank fails to maneuver to correct firing position
PL directs wrong tank to engage
Target out of range
Ammunition/weapon faulty
Fail to make precombat check
Equipment failure
Incorrect aiming point
Failed to boresight or zero correctly
Failed to index proper ammunition
Incorrect firing platform
Run through severe terrain feature (STAR)
Fail to maintain constant speed (STAR)
Gunner fires before tank stops (NONSTAR)
Driver stops too quickly (Rocks Tank)
Fail to give accurate information to fire support elements
Gave wrong coordinates
Map error
PL error
Fail to adjust artillery fire
Improper fire adjustment
Forget to provide information
Fail to determine own location

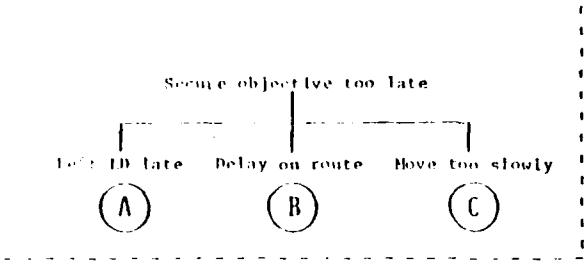


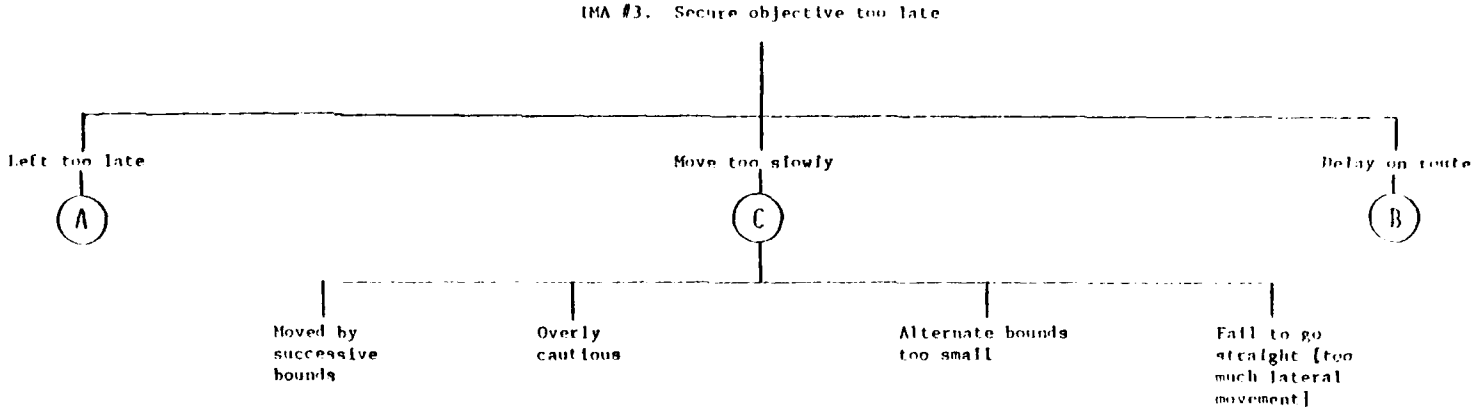
DIA #2. Too few surviving tanks

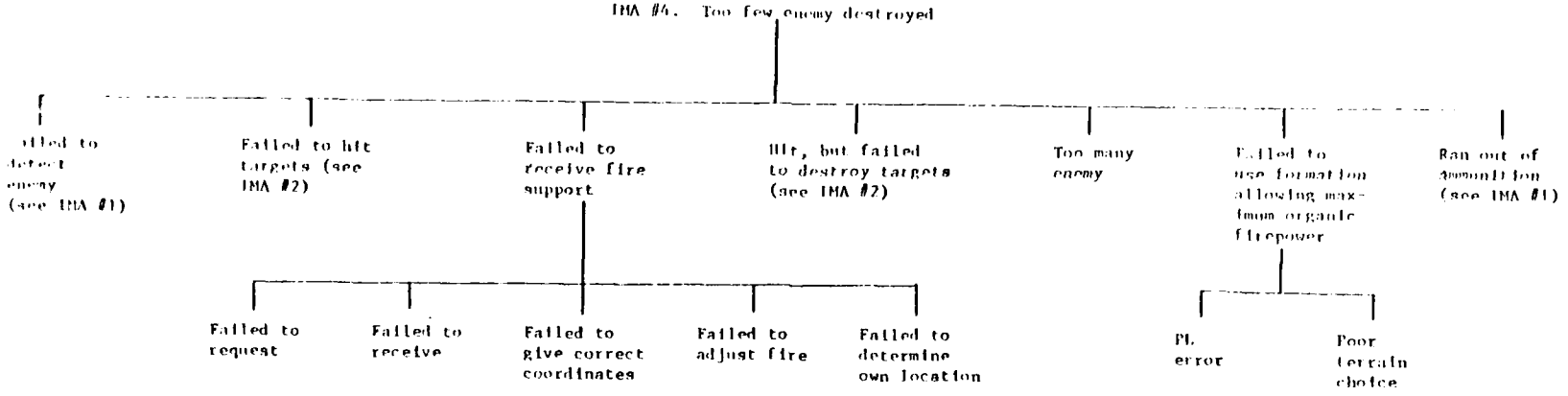

Enemy inflicted losses
Hit by enemy
Fail to reduce vulnerability
A
B
C
IMA #2. Too few surviving tanks
Hit by enemy round
Fail to reduce own vulnerability
C
Failed to recover disabled vehicle
Failed to find hull/turret deflade
Failed to conduct evasive maneuver
PL failed to order
Tanks failed to conduct
Rounds too large
Terrain restrictions
Poor recon
Failed to avoid exposure
Failed to provide overwatch
PL fails to issue order
Tanks fail to respond to order
Failed to use dispersion
PL does not issue order
Tanks do not respond to order
Failed to use supporting fire
Did not Request
Gave incorrect information
Not received
Terrain doesn't provide deflade
Failed to recognize deflade
Failed to recognize threat
Failed to create concealment
Failed to deliver suppressive fire
Failed to call for smoke
Failed to use concealment
Terrain doesn't provide concealment
Failed to select concealed position/ route
Failed to use cover
Terrain doesn't provide cover
Failed to select covered position/ route
Failed to move before reengagement
Failed to cross exposed ground rapidly
Failed to back out of firing position to reengage
Failed to engage multiple targets in priority of danger
Failed to recognize priority of danger
PL failed to control fire
Failed to detect multiple targets


Secure objective too late
Crossed LD late
Delayed en route
Moved too slowly
A
B
C
EHA #3. Secure objective too late
Delayed en route
Crossed LD late
Moved too slowly
Left assembly area late
Delayed en route to attack position
Hesitated in attack position
Lost on way to LD
Fuel/supply delays
Poor planning
Conduct repairs
Map reading
Poor visability
PL error
Uncontrolled factors
Poor maintenance
Equipment breakdown
Poor planning
No request
Late request
Wrong request
No follow-up of late crew reports


Secure objective too late
Crossed LD late
A
Delayed en route
B
Moved too slowly
C
IMA #3. Secure objective too late
Crossed LD late
A
Delay en route
B
Moved too slowly
C
Lost en route
Map reading error
Poor visability
Mechanical failures
Failed to make precombat checks
Uncontrolled factors
Poor maint-enance
Enemy contact
Failed to by-pass
Prolonged contact
Failed to use indirect support
Not available
Did not request
Did not not receive
Inef-fective
Failed to obtain intelligence
Not available
Did not receive
Intelligence incorrect
Poor weather conditions
Terrain difficulties
Selected poor avenue of approach
Only available route
Poor map reading
Poor recon-naissance
Tank(s) mired
Poor recon-naissance
Weather effects
Bad driving


Secure objective too late
Left too late
Delay on route
Move too slowly
A
B
C


IMA #3. Secure objective too late
Left too late
Move too slowly
Delay on route
A
C
B
Moved by successive bounds
Overly cautious
Alternate bounds too small
Fail to go straight (too much lateral movement)


IMA #4. Too few enemy destroyed
Failed to detect enemy (see IMA #1)
Failed to hit targets (see IMA #2)
Failed to receive fire support
Hit, but failed to destroy targets (see IMA #2)
Too many enemy
Failed to use formation allowing maximum organic firepower
Ran out of ammunition (see IMA #1)
Failed to request
Failed to receive
Failed to give correct coordinates
Failed to adjust fire
Failed to determine own location
PL error
Poor terrain choice

MISSION: Maintain hold on defensive position in vicinity of Grid 0088. Be prepared to move to subsequent battle position on order.

CONDITIONS:

ENEMY: Elements of motorized rifle regiment in hasty defensive positions vicinity north of phase line Bravo. Infantry, supported by tanks, digging in vicinity of Grid 0088.

FRIENDLY: First platoon, Company A, 5/22 Armor occupy defensive battle position in vicinity of Grid 0088.

FIRE SUPPORT: Brigade supported by 2/51 Arty (155SP) in general support. A-1, 5/22 has direct support by CSC mortar platoon and has priority of fire.

SERVICE SUPPORT: Class V resupply (ammunition) not available.

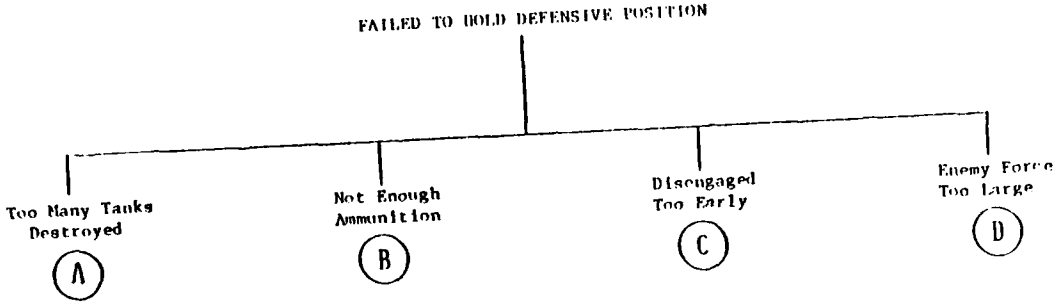
TERRAIN: Wooded and open; gullies.

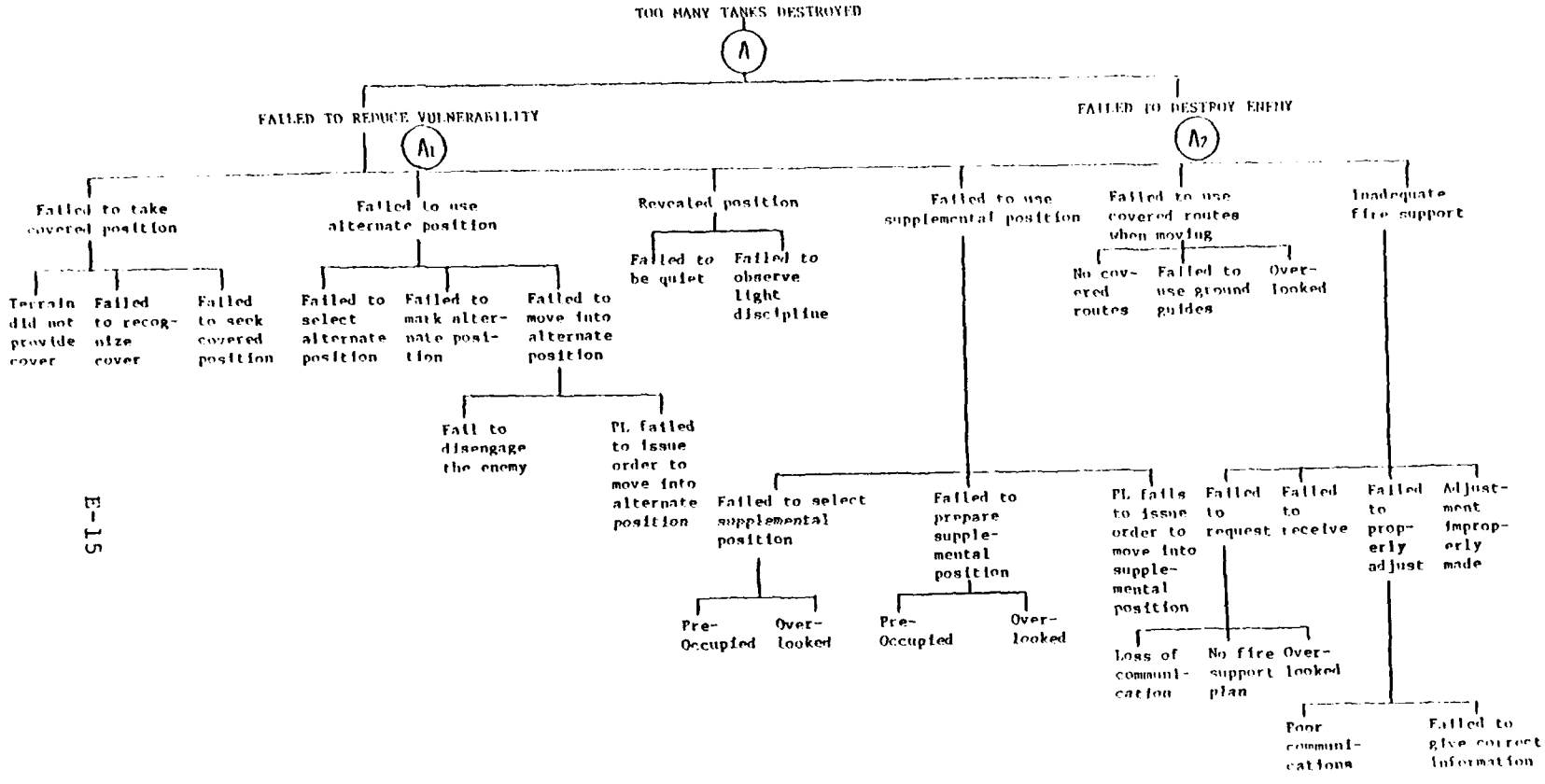
STANDARDS:

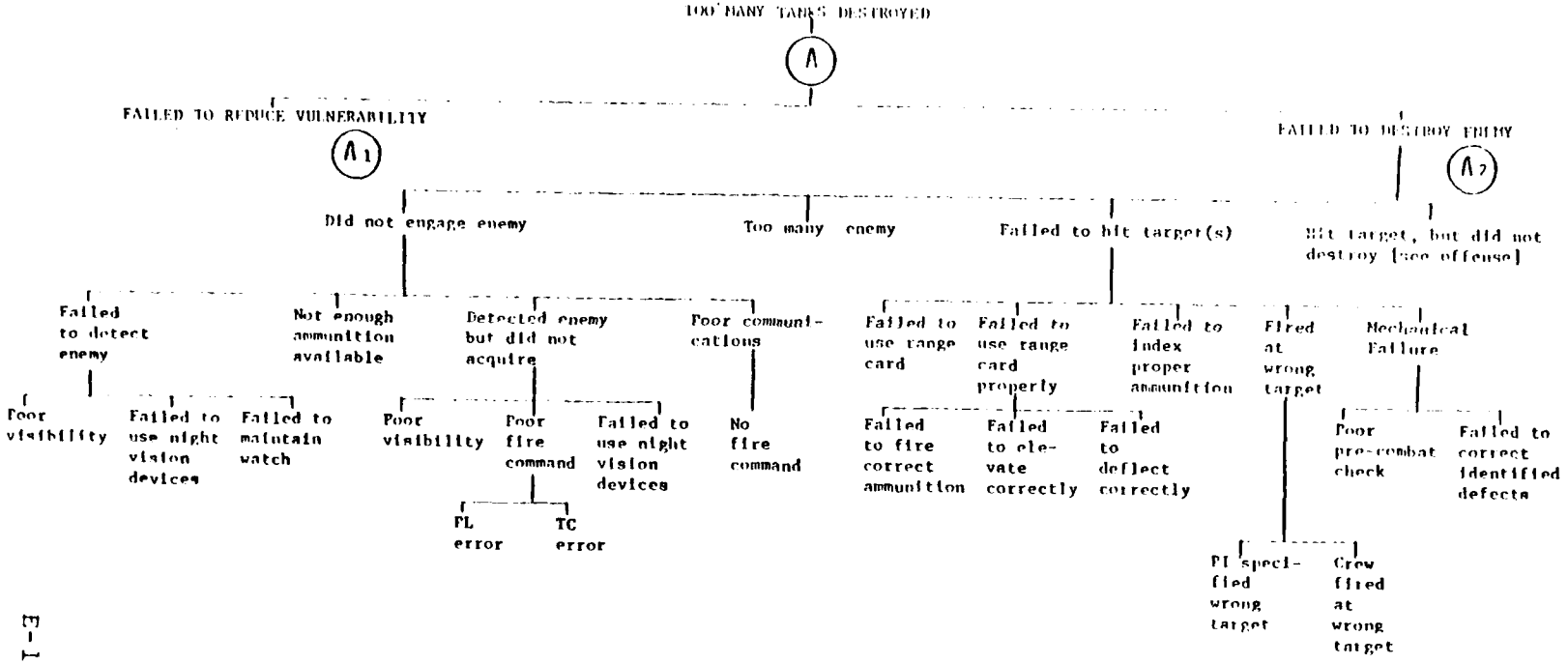
- Minimum of three operational tanks with full crews when order given to move to subsequent battle position.
- Be able to maintain defensive position for specified time.

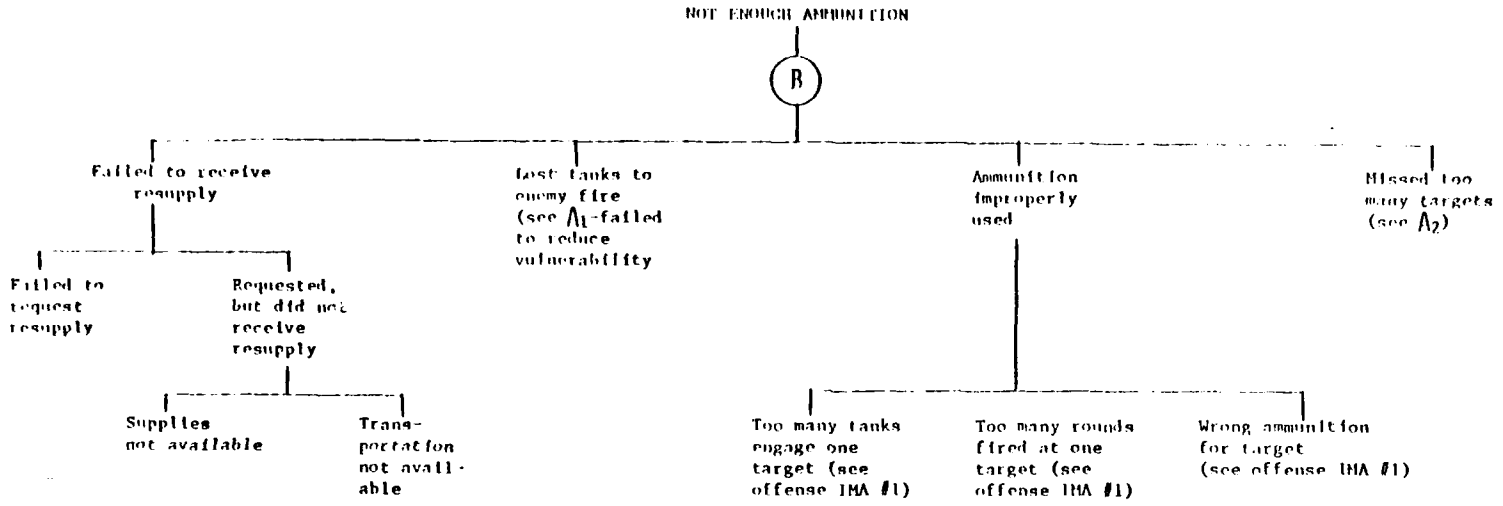
COMBAT FAILURE CRITERIA:

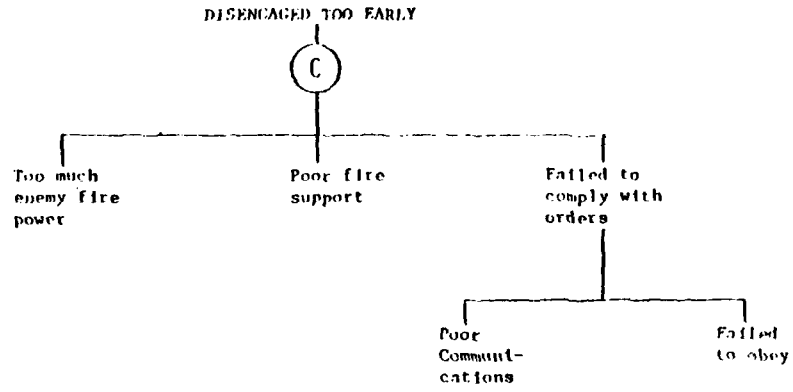
1. Too many tanks destroyed.
2. Not enough ammunition.
3. Disengaged too early.
4. Enemy force too large.


FAILED TO HOLD DEFENSIVE POSITION
Too Many Tanks Destroyed
A
Not Enough Ammunition
B
Disengaged Too Early
C
Enemy Force Too Large
D


TOO MANY TANKS DESTROYED
A
FAILED TO REDUCE VULNERABILITY
A1
FAILED TO DESTROY ENEMY
A2
Failed to take covered position
Failed to use alternate position
Revealed position
Failed to use supplemental position
Failed to use covered routes when moving
Inadequate fire support
Terrain did not provide cover
Failed to recognize cover
Failed to seek covered position
Failed to select alternate position
Failed to mark alternate position
Failed to move into alternate position
Failed to be quiet
Failed to observe light discipline
No covered routes
Failed to use ground guides
Overlooked
Fail to disengage the enemy
PL failed to issue order to move into alternate position
Failed to select supplemental position
Failed to prepare supplemental position
PL fails to issue order to move into supplemental position
Failed to request
Failed to receive
Failed to properly adjust
Adjustment improperly made
Pre-Occupied
Overlooked
Pre-Occupied
Overlooked
Loss of communication
No fire support plan
Overlooked
Poor communications
Failed to give correct information


TOO MANY TANKS DESTROYED
A
FAILED TO REDUCE VULNERABILITY
A1
FAILED TO DESTROY ENEMY
A2
Did not engage enemy
Too many enemy
Failed to hit target(s)
Hit target, but did not destroy [see offense]
Failed to detect enemy
Not enough ammunition available
Detected enemy but did not acquire
Poor communications
Failed to use range card
Failed to use range card properly
Failed to index proper ammunition
Fired at wrong target
Mechanical Failure
Poor visibility
Failed to use night vision devices
Failed to maintain watch
Poor visibility
Poor fire command
Failed to use night vision devices
No fire command
Failed to fire correct ammunition
Failed to elevate correctly
Failed to deflect correctly
Poor pre-combat check
Failed to correct identified defects
FL error
TC error
PL specified wrong target
Crew fired at wrong target


NOT ENOUGH AMMUNITION
B
Failed to receive resupply
Lost tanks to enemy fire (see A1-failed to reduce vulnerability
Ammunition improperly used
Missed too many targets (see A2)
Failed to request resupply
Requested, but did not receive resupply
Supplies not available
Trans-portation not avail-able
Too many tanks engage one target (see offense INA #1)
Too many rounds fired at one target (see offense INA #1)
Wrong ammunition for target (see offense INA #1)


DISENGAGED TOO EARLY
C
Too much enemy fire power
Poor fire support
Failed to comply with orders
Poor Communi-cations
Failed to obey

APPENDIX F

OFFENSIVE AND DEFENSIVE BATTLE RUN TASK ANALYSES (SAMPLES)

OFFENSIVE MISSION

PHASES, TASKS, SUBTASKS, AND MEASUREMENT CONSTRUCTS

PHASE I - PREPARATION AND PLANNING

1.0 TASK - CONDUCT TACTICAL ROAD MARCH

Subtasks 1.1 Platoon Leader Receives Warning Order
1.2 Platoon Leader Transmits Warning Order
1.3 Platoon Leader Receives March Order
1.4 Platoon Leader Transmits March Order
1.5 Platoon Moves Out of Rear Area
1.6 Platoon Maintains March Discipline
1.7 Platoon Maintains March Security
1.8 Platoon Conducts Halts

2.0 TASK - OCCUPY ASSEMBLY AREA

Subtasks 2.1 Platoon Closes on Assembly Area
2.2 Platoon Establishes Local Area
2.3 Platoon Establishes Dismounted Sentries
2.4 Platoon Establishes Mounted Sentries
2.5 Platoon Practices Light, Noise, and Movement Discipline
2.6 Platoon Maintains Listening Silence
2.7 Platoon Establishes Concealment
2.8 Platoon Organizes Defense

3.0 TASK - PREPARE FOR AND PLAN OPERATION

Subtasks 3.1 Troop Leading Procedures

3.1.1 Platoon Leader Receives the Mission
3.1.2 Platoon Leader Assembles Key Subordinates
3.1.3 Platoon Leader Issues a Warning Order
3.1.4 Platoon Disseminates Warning Order
3.1.5 Platoon Leader Makes a Tentative Plan

3.1.5.1 Platoon leader analyzes mission
3.1.5.2 Platoon leader makes estimate of the situation
3.1.5.3 Platoon leader formulates plan

3.1.6 Platoon Leader Starts Necessary Movement
3.1.7 Platoon Leader Reconnoiters

3.1.7.1 Platoon leader plans the reconnaissance
3.1.7.2 Platoon leader conducts local reconnaissance
3.1.7.3 Platoon leader conducts map reconnaissance
3.1.7.4 Platoon leader identifies control measures in the offense

3.1.8 Platoon Leader Completes the Plan

3.1.8.1 Platoon leader plans scheme of maneuver
3.1.8.2 Platoon leader plans fire support
3.1.8.3 Platoon leader coordinates plan with C/T CO

3.1.9 Platoon Leader Assembles Key Subordinates
3.1.10 Platoon Leader Issues OPORD
3.1.11 Platoon Disseminates OPORD

3.2 Platoon Leader/Sergeant Conducts Precombat Checks

4.0 TASK - DEPART ASSEMBLY AREA

Subtasks 4.1 Platoon Removes Camouflage
4.2 Platoon Conducts Security Check of Area
4.3 Platoon Moves Out of Assembly Area

4.3.1 Platoon Uses Terrain

4.3.1.1 Platoon uses covered routes
4.3.1.2 Platoon uses concealed routes
4.3.1.3 Platoon does not skyline
4.3.1.4 Platoon crosses open areas as rapidly as possible
4.3.1.5 Tanks use separate routes

4.3.2 Platoon Leader Controls Movement

4.3.2.1 Platoon leader designates route for platoon

4.3.2.1.1 Platoon leader designates a covered route
4.3.2.1.2 Platoon leader designates a concealed route

4.3.2.1.2.1 Platoon leader avoids obvious avenues of approach
4.3.2.1.2.2 Platoon leader avoids large open areas
4.3.2.1.2.3 Platoon leader avoids obstacles

4.3.2.2 Platoon leader orders platoon to move out
4.3.2.3 Platoon follows route designated by platoon leader
4.3.2.4 Platoon crosses start point on time
4.3.2.5 Platoon conducts tactical movement to the attack position

4.3.2.5.1 Tanks maintain dispersion
4.3.2.5.2 Tanks maintain visual contact with section leaders

4.3.2.6 Platoon deploys at the attack position
4.3.2.7 Sections maintain integrity
4.3.2.8 Platoon leader sets up overwatch and bounding sections
4.3.2.9 Platoon leader and platoon sergeant communicate
4.3.2.9.1 Tanks within sections communicate by hand and arm signals
4.3.2.9.2 Sections communicate by flag signals
4.3.2.9.3 Listening silence is maintained
4.3.2.10 Platoon crosses line of departure on time

PHASE II - MOVEMENT TO CONTACT

1.0 TASK - CONDUCT TACTICAL MOVEMENT

Subtasks 1.1 Platoon Moves in Sections Using Bounding Overwatch

1.1.1 Designated Section Overwatches (OW)

1.1.1.1 OW section leader assigns areas of responsibility vis-a-vis possible enemy positions

1.1.1.1.1 OW section leader assigns fields of observation

1.1.1.1.2 OW section leader assigns fields of fire

1.1.1.2 OW section leader places vehicles in covered, hull-defilade positions

1.1.2 Platoon Leader Controls Movement

1.1.2.1 Platoon leader indicates checkpoint (new OW) to bounding (B) section

1.1.2.2 Platoon leader designates route for B section

1.1.2.2.1 Platoon leader designates a covered route

1.1.2.2.2 Platoon leader designates a concealed route

1.1.2.2.2.1 Platoon leader avoids obvious avenues of approach

1.1.2.2.2.2 Platoon leader avoids large open areas

1.1.2.2.2.3 Platoon leader avoids obstacles

1.1.2.3 Platoon leader orders B section to bound

1.1.3 Designated Section (B) Bounds

1.1.3.1 B section uses terrain

1.1.3.1.1 B section uses covered routes

1.1.3.1.2 B section uses concealed routes

1.1.3.1.3 B section does not skyline

1.1.3.1.4 B section crosses open areas as rapidly as possible

1.1.3.1.5 Tanks use separate routes

1.1.3.2 B section leader controls movement

1.1.3.2.1 B section follows route designated by platoon leader

1.1.3.2.2 Tanks maintain dispersion

1.1.3.2.3 Tanks maintain visual contact with section leader

1.1.3.2.4 B section maintains integrity
1.1.3.2.5 B section moves as rapidly as possible to OW position

1.1.4 B Section Overwatches

1.1.4.1 B section leader assigns areas of responsibility vis-a-vis possible enemy positions

1.1.4.1.1 B section leader assigns fields of observation
1.1.4.1.2 B section leader assigns fields of fire

1.1.4.2 B section leader places vehicles in covered, hull-defilade positions
1.1.4.3 B section leader reports occupation of OW with flag signals

1.1.5 Platoon Leader Selects Next OW Position

1.1.5.1 Platoon leader chooses next OW based on terrain
1.1.5.2 Platoon leader chooses next OW based on own OW weapon range

1.1.6 OW Section (-) Bounds to New OW Position

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1.1.4.2

1.1.7 Platoon Leader Designates OW & B Sections

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1.1.7

1.2 Platoon Takes Active Countermeasures to *Support B Section*

1.2.1 OW Section Leader Controls Direct Fire

1.2.1.1 OW section leader issues section fire command
1.2.1.2 OW section places direct fire on likely enemy positions
1.2.1.3 OW section leader shifts direct fire to other likely enemy positions

1.2.1.3.1 OW section suppresses with HEP
1.2.1.3.2 OW section suppresses with mgs
1.2.1.3.3 OW section obscures with smoke

1.2.2 OW Section Leader Controls Indirect Fire

1.2.2.1 OW section leader requests indirect fire

1.2.2.1.1 OW section leader requests suppressive fire
1.2.2.1.2 OW section leader requests obscurational fire

1.2.2.2 OW section leader supplies TRP data
1.2.2.3 OW section leader adjusts indirect fire
1.2.2.4 OW section leader uses proper RTP and CEOI

1.2.3 B Section TCs Suppress Likely Enemy Positions with Reconnaissance by (Machinegun) Fire
1.2.4 B Section Tanks Make Abrupt Speed and Direction Changes
1.2.5 B Section Tanks Employ Self-Screening Smoke
1.2.6 B Section Tanks Reduce Smoke Plumes from Heaters and Exhausts

1.3 Platoon Leader Maintains Control

1.3.1 Sections Maintain Integrity
1.3.2 Platoon Leader and Platoon Sergeant Communicate

1.3.2.1 Tanks within sections communicate by hand and arm signals
1.3.2.2 Sections communicate by flag signals
1.3.2.3 Listening silence is maintained

2.0 TASK - PLATOON REACTS TO CONTACT

Subtasks 2.1 Platoon Employs Fire and Maneuver

2.1.1 Platoon Acquires All Visible Targets
2.1.2 Bounding Section Maneuvers to Cover
2.1.2.1 B section uses terrain
2.1.2.1.1 B section uses covered route
2.1.2.1.2 B section uses concealed route
2.1.2.1.3 B section does not skyline
2.1.2.1.4 B section crosses open area as rapidly as possible
2.1.2.1.5 B tanks use separate routes

2.1.2.2 B section uses ATGM counteraction drill
2.1.2.2.1 B tanks duck
2.1.2.2.2 B tanks dodge
2.1.2.2.3 B tanks zig and zag

2.1.2.3 B section moves rapidly to closest cover
2.1.2.4 B section moves into covered, hull-defilade positions

2.1.2.4.1 B tanks maintain dispersion
2.1.2.4.2 B tanks maintain visual contact with section leader
2.1.2.4.3 B section maintains integrity

2.1.3 Bounding Section Engages on the Move

2.1.3.1 B section engages in stabilized mode
2.1.3.2 B section engages targets in priority of danger
2.1.3.3 B section fires first fast
2.1.3.4 B section marks target(s) with tracers or WP
2.1.3.5 B section suppresses/destroys target(s)

2.1.4 Bounding Section Engages from Defilade

2.1.4.1 B section leader controls direct fire

2.1.4.1.1 B section leader issues section fire command
2.1.4.1.2 B section distributes fire

2.1.4.1.2.1 B section uses appropriate pattern of fire
2.1.4.1.2.2 B section distributes fire as commanded

2.1.4.1.3 B section leader uses proper RTP and CEOI

2.1.4.2 B section neutralizes target(s)

2.1.4.2.1 B section engages target(s) in priority of danger
2.1.4.2.2 B section fires (first) fast
2.1.4.2.3 B section suppresses/destroys target(s)

2.1.5 OW Section Supports by Direct Fire

2.1.5.1 OW section leader controls direct fire

2.1.5.1.1 OW section leader issues section fire command
2.1.5.1.2 OW section distributes fire

2.1.5.1.2.1 OW section uses appropriate pattern of fire
2.1.5.1.2.2 OW section distributes fire as commanded

2.1.5.1.3 OW section leader uses proper RTP and CEOI

2.1.5.2 OW section neutralizes target(s)

2.1.5.2.1 OW section engages target(s) in priority of danger
2.1.5.2.2 OW section fires (first) fast
2.1.5.2.3 OW section suppresses/destroys target(s)

2.1.6 OW Section Supports by Indirect Fire

2.1.6.1 OW section leader controls indirect fire

2.1.6.1.1 OW section leader requests indirect fire

2.1.6.1.1.1 OW section leader requests suppressive fire

2.1.6.1.1.2 OW section leader requests obscurational fire

2.1.6.1.2 OW section leader supplies TRP data
2.1.6.1.3 OW section leader adjusts indirect fire
2.1.6.1.4 OW section leader uses proper RTP and CEOI

2.1.7 Platoon Leader Issues Spot Report

2.1.7.1 Platoon leader submits accurate and complete report
2.1.7.2 Platoon leader uses proper RTP and CEOI

PHASE III - ASSAULT

1.0 TASK - DEPLOY AT ASSAULT POSITION

Subtasks 1.1 Platoon Moves into Assault Position

1.1.1 Platoon Leader Controls Movement

1.1.1.1 Platoon leader designates positions to platoon

1.1.1.2 Platoon leader designates routes for platoon

1.1.1.2.1 Platoon leader designates a covered route

1.1.1.2.2 Platoon leader designates a concealed route

1.1.1.2.2.1 Platoon leader avoids obvious avenues of approach

1.1.1.2.2.2 Platoon leader avoids large open areas

1.1.1.2.2.3 Platoon leader avoids obstacles

1.1.1.3 Platoon leader orders deployment at the assault position

1.1.2 Platoon Moves into Position

1.1.2.1 Platoon uses terrain

1.1.2.1.1 Platoon uses covered routes

1.1.2.1.2 Platoon uses concealed routes

1.1.2.1.3 Platoon does not skyline

1.1.2.1.4 Platoon crosses open areas as rapidly as possible

1.1.2.1.5 Tanks use separate routes

1.1.2.2 Section leaders control movement

1.1.2.2.1 Sections follow routes designated by platoon leader

1.1.2.2.2 Tanks maintain dispersion

1.1.2.2.3 Tanks maintain visual contact with section leaders

1.1.2.2.4 Sections maintain integrity

1.1.2.2.5 Sections move as rapidly as possible to assault positions

1.2 Platoon Executes Assault on Objective

1.2.1 Platoon Leader Orders Assault on Objective

1.2.2 Platoon Bounds to Objective

1.2.2.1 Platoon uses terrain

1.1.2.1.1

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1.1.2.1.5

1.1.2.1.6 Tanks close hatches

1.2.2.2 Section leaders control movement

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1.1.2.2.3

1.2.2.2.1 Tanks move as rapidly as possible to the objective

1.2.2.2.2 Tanks do not stop in the assault

1.2.2.3 Sections use ATGM counteraction drills

1.2.2.3.1 Tanks duck

1.2.2.3.2 Tanks dodge

1.2.2.3.3 Tanks zig and zag

1.2.3 Platoon Engages Target(s) on Objective

1.2.3.1 Platoon leader controls indirect fire

1.2.3.1.1 Platoon leader requests indirect fire

1.2.3.1.1.1 Platoon leader requests suppressive fire

1.2.3.1.1.2 Platoon leader requests obscurational fire

1.2.3.1.2 Platoon leader supplies TRP data

1.2.3.1.3 Platoon leader adjusts indirect fire

1.2.3.1.4 Platoon leader shifts indirect fire

1.2.3.1.5 Platoon leader uses proper RTP and CEOI

1.2.3.2 Platoon leader controls direct fire

1.2.3.2.1 Platoon engages in stabilized mode

1.2.3.2.2 Platoon leader issues platoon fire command

1.2.3.2.3 Platoon distributes fire

1.2.3.2.3.1 Platoon uses appropriate pattern of fire

1.2.3.2.3.2 Platoon distributes fire as commanded

1.2.3.2.3.3 Platoon masses fire power

1.2.3.2.4 Platoon leader uses proper RTP and CEOI

1.2.3.3 Platoon neutralizes target(s)

1.2.3.3.1 Platoon engages target(s) in priority of danger
1.2.3.3.2 Platoon fires (first) fast
1.2.3.3.3 Platoon suppresses/destroys target(s)

1.3 Platoon Occupies Objective

1.3.1 Platoon Moves Rapidly to Closest Cover
1.3.2 Platoon Moves into Covered Hull-Defilade Positions

1.3.2.1 Tanks maintain dispersion
1.3.2.2 Tanks maintain visual contact with section leaders
1.3.2.3 Sections maintain integrity

1.3.3 Platoon Leader Assigns Areas of Responsibility Vis-a-Vis Possible Enemy Positions

1.3.3.1 Platoon leader assigns fields of observation
1.3.3.2 Platoon leader assigns fields of fire

1.3.4 Platoon Leader Issues Situation Report

1.3.4.1 Platoon leader submits accurate and complete report
1.3.4.2 Platoon leader uses proper RTP and CEOI

PHASE IV - CONSOLIDATION AND REORGANIZATION AFTER AN ATTACK

1.0 TASK - CONSOLIDATE POSITION

Subtasks 1.1 Platoon Prepares for a Counterattack
1.2 Platoon Prepares to Continue Attack

2.0 TASK - REORGANIZE

Subtasks 2.1 Platoon Reports

2.1.1 Losses
2.1.2 Ammo Expenditures
2.1.3 Fuel Status
2.1.4 Vehicle Condition

2.2 Platoon Redistributes Supplies and Equipment
2.3 Platoon Restores Communications with Units Out of Contact
2.4 Perform Maintenance Checks and Emergency Repairs

DEFENSIVE MISSION

PHASES, TASKS, SUBTASKS, AND MEASUREMENT CONSTRUCTS

PHASE I - PREPARATION AND TRAVELING

1.0 TASK - CONDUCT TACTICAL ROAD MARCH

Subtasks 1.1 Platoon Leader Receives Warning Order
1.2 Platoon Leader Transmits Warning Order
1.3 Platoon Leader Receives March Order
1.4 Platoon Leader Transmits March Order
1.5 Platoon Moves Out of Rear Area
1.6 Platoon Maintains March Discipline
1.7 Platoon Maintains March Security
1.8 Platoon Conducts Halts

2.0 TASK - OCCUPY ASSEMBLY AREA

Subtasks 2.1 Platoon Closes on Assembly Area
2.2 Platoon Establishes Local Area
2.3 Platoon Establishes Dismounted Sentries
2.4 Platoon Establishes Mounted Sentries
2.5 Platoon Practices Light, Noise, and Movement Discipline
2.6 Platoon Maintains Listening Silence
2.7 Platoon Establishes Concealment
2.8 Platoon Organizes Defense

3.0 TASK - PREPARE FOR AND PLAN OPERATION

Subtasks 3.1 Troop Leading Procedures

3.1.1 Platoon Leader Receives the Mission
3.1.2 Platoon Leader Assembles Key Subordinates
3.1.3 Platoon Leader Issues a Warning Order
3.1.4 Platoon Disseminates Warning Order
3.1.5 Platoon Leader Conducts Map Reconnaissance
3.1.6 Platoon Leader Makes a Tentative Plan

3.1.6.1 Platoon leader analyzes mission
3.1.6.2 Platoon leader makes estimate of the situation
3.1.6.3 Platoon leader formulates plan

3.1.7 Platoon Leader Completes the Plan for Relief
3.1.8 Platoon Leader Assembles Key Subordinates
3.1.9 Platoon Leader Issues OPORD
3.1.10 Platoon Disseminates OPORD

3.2 Platoon Leader/Sergeant Conducts Precombat Checks

4.0 TASK - DEPART ASSEMBLY AREA

Subtasks 4.1 Platoon Removes Camouflage
4.2 Platoon Conducts Security Check of Area
4.3 Platoon Moves Out of Assembly Area

4.3.1 Platoon Uses Terrain

4.3.1.1 Platoon uses covered routes
4.3.1.2 Platoon uses concealed routes
4.3.1.3 Platoon does not skyline
4.3.1.4 Platoon crosses open areas as rapidly as possible
4.3.1.5 Tanks use separate routes

4.3.2 Platoon Leader Controls Movement

4.3.2.1 Platoon leader designates route for platoon

4.3.2.1.1 Platoon leader designates a covered route
4.3.2.1.2 Platoon leader designates a concealed route

4.3.2.1.2.1 Platoon leader avoids obvious avenues of approach
4.3.2.1.2.2 Platoon leader avoids large open areas
4.3.2.1.2.3 Platoon leader avoids obstacles

4.3.2.2 Platoon leader orders platoon to move out
4.3.2.3 Platoon follows route designated by platoon leader
4.3.2.4 Platoon conducts tactical movement to the battle position

4.3.2.4.1 Tanks maintain dispersion
4.3.2.4.2 Tanks maintain visual contact with section leaders
4.3.2.4.3 Platoon moves by traveling

4.3.2.5 Sections maintain integrity
4.3.2.6 Platoon leader and platoon sergeant communicate

4.3.2.6.1 Tanks within sections communicate by hand and arm signals
4.3.2.6.2 Sections communicate by flag signals
4.3.2.6.3 Listening silence is maintained

4.3.2.7 Platoon reaches battle positions or time

PHASE II - OCCUPY BATTLE POSITION

2.0 TASK - CONDUCT RELIEF IN PLACE

Subtasks 2.1 Coordination of Relief

2.1.1 Exchange of Password
2.1.2 Receipt of Map Overlays and Sectors of Responsibility by Relieving Platoon Leader
2.1.3 Platoon Leaders Coordinate Withdrawal Route
2.1.4 Platoon Leaders Coordinate Withdrawal Time
2.1.5 Platoon Sergeant Visits Each Tank Position
2.1.6 Platoon Exchanges Range Cards for Primary and Alternate Positions

2.2 Platoon Moves Into Primary Battle Positions

2.2.1 Tanks Take Up Position Without Hesitation

2.2.1.1 Loaders ground guide tanks into position
2.2.1.2 Section leaders place vehicles in covered, turret-defilade positions

2.2.2 Tanks Maintain Dispersion
2.2.3 Sections Maintain Integrity

2.3 Platoon Establishes Dismounted Sentries
2.4 Platoon Establishes Mounted Sentries
2.5 Platoon Lays Wire for Communication

2.5.1 All Tanks Connected on Hot Loop
2.5.2 Dismounted Sentries Connected on Hot Loop

2.6 Platoon Inspects Alternate Positions

2.6.1 Tank Commanders Walk Ground to Alternate Positions
2.6.2 Tanks Rehearse Movement to Alternate Positions

2.7 Platoon Practices Light, Noise, and Movement Discipline

3.0 TASK - PREPARE AND PLAN DEFENSE

Subtask 3.1 Troop Leading Procedures

3.1.1 Platoon Leader Reconnoiters

3.1.1.1 Platoon leader plans the reconnaissance
3.1.1.2 Platoon leader conducts local reconnaissance
3.1.1.3 Platoon leader conducts map reconnaissance

3.1.1.4 Platoon leader identifies target reference points (TRPs)

3.1.2 Platoon Leader Completes the Plan

3.1.3 Platoon Leader Selects Supplemental Positions

3.1.3.1 Positions have unrestricted observation and field of fire

3.1.3.2 Positions provide opportunity to open fire at maximum ranges

3.1.3.3 Positions cover all assigned sectors

3.1.3.4 Coordination of positions provides overlapping fires

3.1.3.5 Positions provide hull-down or turret-down cover

3.1.3.6 Positions provide concealment

3.1.3.7 Positions avoid major terrain features

3.1.3.8 Positions accessible by covered and concealed routes

3.1.4 Platoon Leader Develops a Fire Plan

3.1.4.1 Platoon leader assigns vehicle positions and sectors of fire

3.1.4.2 Platoon leader designates TRPs to tank commanders

3.1.4.3 Platoon leader integrates information from tank commanders about targets in each TC's sector

3.1.4.4 Platoon leader plans indirect fire and illumination

3.1.4.5 Platoon leader coordinates fire plan with C/T CO

3.1.4.6 Platoon leader distributes platoon fire plan with tank commanders

3.1.4.7 Platoon rehearses fire plan

3.1.5 Platoon Leader Plans Movement to Supplemental Battle Positions

3.1.5.1 Movement uses covered routes

3.1.5.2 Movement uses concealed routes

3.1.6 Platoon Leader Briefs Platoon on Movement to Supplemental Battle Positions

3.1.6.1 Platoon leader indicates routes

3.1.6.2 Platoon leader indicates checkpoints (new OW positions) for bounding section

PHASE III - DEFENSE OF BATTLE POSITION

1.0 TASK - PLATOON REACTS TO CONTACT

Subtasks 1.1 Platoon Acquires All Visible Targets
1.2 Platoon Leader Controls Indirect Fire

1.2.1 Platoon Leader Requests Indirect Fire

1.2.1.1 Platoon leader requests suppressive/destructive fire
1.2.1.2 Platoon leader supplies TRP data
1.2.1.3 Platoon leader adjusts indirect fire
1.2.1.4 Platoon leader shifts indirect fire
1.2.1.5 Platoon leader uses proper RTP and CEOI

1.3 Platoon Leader Controls Direct Fire

1.3.1 Platoon Leader Requests Illumination

1.3.1.1 Platoon leader supplies TRP data
1.3.1.2 Platoon leader uses proper RTP and CEOI

1.3.2 Platoon Uses IR Flicker Illumination Techniques as Needed
1.3.3 Platoon Leader Issues Fire Command

1.3.3.1 Fire command contains alert element
1.3.3.2 Fire command delineates ammunition, weapon, or searchlight
1.3.3.3 Fire command identifies target
1.3.3.4 Fire command gives direction of target if needed
1.3.3.5 Fire command gives range if accurate assessment possible
1.3.3.6 Fire command gives execution

1.3.4 Platoon Distributes Fire

1.3.4.1 Platoon/sections use appropriate pattern of fire
1.3.4.2 Platoon/sections distribute fire as needed

1.3.4.2.1 Platoon/sections use nearest half
1.3.4.2.2 Platoon/sections use sector of fire
1.3.4.2.3 Platoon/sections use engagement area

1.3.5 Platoon Leader Uses Proper RTP and CEOI

1.4 Platoon Neutralizes Target(s)

1.4.1 Platoon Engages Target(s) in Priority of Danger

1.4.2 Platoon Fires (first) Fast
1.4.3 Platoon Suppresses/Destroys Target(s)

1.5 Platoon Leader Controls Movement

1.5.1 Tanks Move From Primary Position To Alternate Position After Each Engagement
1.5.2 Tanks Return To Turret Defilade After Each Engagement

1.6 Platoon Leader Issues Spot Report

1.6.1 Spot Report Contacts Identifying Call Sign for Platoon Leader
1.6.2 Spot Report Contains Time of Report
1.6.3 Spot Report Contains Identification of Target and Location
1.6.4 Spot Report Indicates Target's Activity
1.6.5 Spot Report Indicates Platoon's Action With Regard to Target
1.6.6 Platoon Leader Uses Proper RTP and CEOI

PHASE IV - MOVEMENT TO SUPPLEMENTAL BATTLE POSITION

1.0 TASK - CONDUCT TACTICAL MOVEMENT

Subtasks 1.1 Platoon Leader Initiates Movement to Supplemental Battle Position
1.2 Platoon Moves in Sections Using Bounding Overwatch

1.2.1 Platoon Leader Designates Bounding (B) and Overwatch (OW) Sections
1.2.2 Designated Section Overwatches
1.2.3 Platoon Leader Controls Movement

1.2.3.1 Platoon leader orders B section to bound

1.2.4 Designated Section (B) Bounds

1.2.4.1 B section uses terrain

1.2.4.1.1 B section uses covered routes
1.2.4.1.2 B section uses concealed routes
1.2.4.1.3 B section does not skyline
1.2.4.1.4 B section crosses open areas as rapidly as possible
1.2.4.1.5 Tanks use separate routes

1.2.4.2 B section leader controls movement

1.2.4.2.1 B section follows route designated by platoon leader
1.2.4.2.2 Tanks maintain dispersion
1.2.4.2.3 Tanks maintain visual contact with section leader
1.2.4.2.4 B section maintains integrity
1.2.4.2.5 B section moves as rapidly as possible to OW (supplemental battle) position

1.2.5 B Section Overwatches

1.2.5.1 B section leader assigns areas of responsibility vis-a-vis
1.2.5.2 B section leader reports occupation of OW (supplemental battle position)

1.2.6 OW Section (-) Bounds to New OW Position

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1.2.7 Platoon Leader Designates OW & B Sections

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1.3 Platoon Takes Active Countermeasures to Support B Section

1.3.1 OW Section Leader Controls Direct Fire

1.3.1.1 OW section leader issues section fire command
1.3.1.2 OW section places direct fire on enemy positions
1.3.1.3 OW section leader shifts direct fire tc other enemy positions as needed

1.3.1.3.1 OW section suppresses with HEP
1.3.1.3.2 OW section suppresses with mgs
1.3.1.3.3 OW section obscures with smoke

1.3.2 OW Section Leader Controls Indirect Fire

1.3.2.1 OW section leader requests indirect fire

1.3.2.1.1 OW section leader requests suppressive fire

1.3.2.1.2 OW section leader requests obscurational fire

1.3.2.2 OW section leader supplies TRP data

1.3.2.3 OW section leader adjusts indirect fire

1.3.2.4 OW section leader uses proper RTP and CEOI

1.3.3 B Section TCs Suppress Likely Enemy Positions with Reconnaissance by (Machinegun) Fire

1.3.4 B Section Tanks Make Abrupt Speed and Direction Changes

1.3.5 B Section Tanks Employ Self-Screening Smoke

1.4 Platoon Leader Maintains Control

1.4.1 Platoon Closes Hatches During Incoming Artillery

1.4.2 Sections Maintain Integrity

1.4.3 Platoon Leader and Platoon Sergeant Communicate

1.4.3.1 Tanks within sections communicate by filtered lights

1.4.3.2 Sections communicate by radio

1.4.3.3 Proper RTP and CEOI is used

1.4.4 Light and Noise Discipline Maintained

PHASE V - DEFENSE OF SUPPLEMENTAL BATTLE POSITION

Subtasks 1.1 Platoon Acquires All Visible Targets
1.2 Platoon Leader Controls Indirect Fire
1.3 Platoon Leader Requests Illumination
1.4 Platoon Neutralizes Target(s)
1.5 Platoon Leader Controls Movement
1.6 Platoon Leader Issues Spot Report

APPENDIX G

MAP-PLAYER EXERCISE (MPE): SINGLE-PLAYER AND DELPHI MODES

In this Appendix the development and tryout of the Map-Player Exercise (MPE) are described for an offensive platoon battle run. The purpose of this activity was to examine the feasibility of basing the generation of platoon gunnery standards on a map simulation of an offensive mission. A single-player and a Delphi mode of play were investigated.

MPE DEVELOPMENT

The MPE used was adapted from an ARI-developed game used in conjunction with REALTRAIN exercises conducted at Fort Carson, Colorado. The map used in the ARI game was used for the MPE and the engagement rules for that exercise formed the basic structure of the MPE.

MPE materials. The map is a 1:50,000 orthophotomap of Fort Carson. The photomap is an aerial photograph with overprint grid lines, contour lines, and symbols for topographic and man-made features. This map was blown up approximately 400 times so that one grid square (1000 meters) measures 32cm (12 5/8"). Playing pieces for MPE were 1:285 scale models of M60A1, T62, BRDM and ATGM used to depict friendly tanks and threat vehicles. Movement rules were displayed on a cardboard template that players used for planning movement and planning preplotted fires.

Preliminary trials. The initial work in developing the offensive scenario did not proceed with a specific scenario in mind. Rather two of the staff members tried a variety of of missions on a variety of areas on the map. One staff member studied a section of the MPA, outlined a brief oral order and acted as controller. The other staff member played the game using the ARI rules. Staff members then discussed what had occurred, the player's rationale and the controller's rationale. A variety of missions including attacks, movement to contact, and security were examined.

An intuitive process was used to determine whether a trial MPE showed promise. Missions and terrain that offered a variety of movement routes and overwatch positions, a readily discernable objective, and some realistic potential positions for threat locations were considered for further development. These promising missions were then replayed with other staff associates.

Friendly forces always consisted of one tank platoon (5 tanks). Artillery was generally not employed during the preliminary trials. Exercises were run in almost all map directions (north-south, south-north, east-west and north-east to south-west). The largest areas of the map used

measured about 4000 x 4000 meters. This was generally the limit of the playing field that was reasonably available on the large-scale map as well as the outside limit for a realistic platoon operation. Approximately 30 missions were run during the preliminary trial phase.

Specific scenario. The goal of the preliminary trials was to develop a scenario that was generally parallel to the Sample Platoon Battle Run Offense (Day) contained in (DRAFT) Change 2, FM 17-12-2 and as employed on the Ft. Knox, Kentucky battle run. The scenario as outlined in FM 17-12-2 is very general. Friendly forces consist of 1 tank platoon (5 tanks) with no cross reinforcement, attachments or support. (The Ft. Knox battle run provides for 4.2" mortar support.) The platoon starts in an assembly area and is given an order to seize part of a company team objective. No specific distances (from the assembly area to the objective) are mentioned in the FM, but maximum engagement distance is 1800-2000 meters. The Ft. Knox battle run conforms with this general outline with the exception that the move from the assembly area to the attack position is an administrative move.

The MPE scenario is set up as a south-north platoon attack on a prominent hill mass that has been identified as the objective and is approximately 3000 meters from the assembly area. The platoon zone width does not exceed 2000 meters. Although the platoon is operating as part of a company team, it is operating without reinforcement or cross attachment, although in the final version of the OPORD, artillery (155) support is allowed.

The section for play includes a variety of terrain conditions. Woods, open areas, hills, trail networks and streams are all represented. The left (west) boundary is an easily identifiable hard surface road that is off limits to the platoon. The east boundary, while not as easily identifiable, consists of a trail network. An operation order was developed to support the scenario.

Initially, two scenarios were developed--each involving an attack, but otherwise quite different. The second scenario involved terrain that was quite flat and unvegetated. The objective was the only piece of high, wooded ground in the area. One stream and two trails bisected the designated maneuver area. No threat was employed as part of this second scenario.

The intention of the second scenario was to help the MPE player become familiar with the map scale, movement,and function of the controller--a "dry run" to assure familiarity with the mechanics of MPE. The second scenario was run with the first four players, then abandoned. MPE is not complicated enough

to warrant a dry run and the extra time required (15 to 30 minutes) for this run seriously cut into the limited time that players were available. Even if more time were available with future players, it would not appear that there are enough benefits from this scenario to warrant its reintroduction.

Operation order. An operation order was prepared for each scenario. This "Frag" order was based on OPORD used for the REALTRAIN Validation for Armor/Anti-Armor Teams with modifications as necessary to meet the MPE requirements. The printed OPORD is handed to the player along with a 1:50,000 topographic military map of the area, for use during the player's planning phase. No overlay was provided for the 1:50,000 scale map. It should be noted that the OPORD is marked by an absence of control measures, such as phase lines, check points, attack position, and limiting lines. While this lack did not seem to influence the MPE, some consideration should be given to the introduction of some control measures to add to the realism of the event. As a minimum an LD should be specified on an overlay.

The OPORD used with the primary scenario was as follows:

> Contact with OPFOR has been lost. At last light yesterday air OPs reported enemy tanks and ATM in the vicinity of 099718 and enemy BRDMs and BMPs on the trail network in the vicinity of 077713. A 155 Battalion is in DS of our Battalion TF. We have an ASR allowing you 4 HE missions and 3 smoke missions. Our company team will provide the Advance Guard for our TF. You are designated the Point of the Advance Guard. You will move at H-Hour from your assembly area at your present location (073700). You will seize and hold the key terrain centered at 095726 and destroy any opposing force contacted. You will occupy this position until ordered to move to the northeast. Your west boundary is the highway. This highway is off limits. Your east boundary is a line running from 102704 to 103718. Any questions?
>
> Time is now H-Hour minus _____. You must have your preplanned fires in to me by H-Hour minus _____.

Threat. The threat appeared to cause the greatest problems during the MPE. FM 17-12-2 Change 2 (Draft) lists the following threat arrays for the Sample Platoon Battle Run Offense (Day):

Number	Type	Range	Threat Action or Condition
4	BMP	1000-1400m	Fire on platoon
1	ATGM Team	600-800m	Unk
1	BRDM	800-1000m	Unk
3	BMP	1100-1400m	Unk
4	T62	1800-2000m	Unk
3	ATGM Team	800-1000m	Unk
	Troops	400m	Dismounted
2	T62	1200-1600m	Moving (on objective)
2	T62	Unk	Hulldown (on objective)
2	T62	800-1000m	Hulldown (on objective)
3	Rifle Squads	800-1000m	On objective
3	T62	1000-1400m	Hulldown (on objective)
2	Rifle Squads	600-800m	On objective

Experience during the initial staff tryouts indicated a need to reduce the size and frequency of the threat to allow realistic maneuver and reactions. Further, the full threat in a maneuver area as small as the MPE employs (3000 x 2000 meters) is not realistic. Thus, the following threat array was portrayed:

1. 4 BMP
2. 3 BMP
3. 1 ATGM team
   1 BRDM
4. 4 T62 (hulldown)
5. 4 T62 (hulldown on objective)

This array was modified after some subjects were run through the MPE. The 3 BMP were eliminated; the 4 T62 (hulldown) were changed to 3 T62 (exposed). The 4 T62 hulldown (on the objective) were changed to 3 T62 hulldown. These changes were made because of the numerous complaints that the threat could not realistically be engaged by a tank platoon. Even after these adjustments were made, players still criticized this aspect of the MPE.

The four enemy locations were preplotted and remained standardized for all runs. The controller introduced the threat by placing the enemy miniatures on the board when he wanted them to engage or be seen by the friendly forces. The range of engagement depended somewhat on the route the player took; however, the BMP engagements varied from 800-1400m, T62 from 1000-1800m, the BRDM from 500-1500m, and ATGM from 500-1500m. If a player selected a route that would not expose him to the preplanned enemy position, that threat was not introduced. Likewise, a missile threat was not introduced if the player exposed his tanks within approximately 500 meters. The controller decided when to (for example) open fire, fire on the lead tank or wait until more tanks were exposed. The controller also announced which friendly tanks were being engaged. During the preliminary trials and pilot runs, all threat action consisted of firing on the friendly tanks; there were no threats that were not engaging. This may have been an error and may have added to the players' perception of the threat as too overwhelming. Future applications should vary the actions of the threat as exposed but not engaging, flank moving, withdrawing, moving into position or other variations that would not only reduce the apparent overwhelming nature of the threat but also elicit differing reactions on the part of the players.

Rules for MPE. The ARI-developed rules were the point of departure for the MPE. The ARI rules, however, were designed for a combined arms team engagement using an opposing-forces players concept such as REALTRAIN and involved casualty assessment. These rules were more thorough and complex than what was needed for MPE so rule adjustments were made.

One major change from the ARI rules was the *elimination of the hex overlay* as a control measure. Its use was not deemed necessary because of the relatively simple requirements of MPE as compared with the complexity of the ARI game. The MPE experience showed that the absence of the hexes did not adversely affect the control of the game although the hexes probably would have enhanced the efficiency and fidelity of the transcript of the play.

The controller watched *movement* and informed the player if he moved too far. Some minor variations on movement were allowed or enforced during play depending upon the terrain and method of movement. For example, if all tanks crossed a stream at the same point (tracking behind the lead tank) they were allowed to move faster than if they each crossed the stream at different points. Likewise, movement rates through vegetated areas were adjusted depending on the density of the vegetation.

All requests to the team commander for *assistance reinforcement* or relief from the mission were denied. Artillery fires were denied after four HE missions and two smoke missions.

No friendly casualties were assessed. This decision was made after experimentation during the initial phases with varying threats. Assessment of casualties would have soon produced a situation where the friendly platoon would have been effectively eliminated as a combat entity far short of the objective.

Inflicted casualties were not assessed per se. After the friendly force responded to the enemy engagement by fire and maneuver and "develop the situation" to the satisfaction of the controller, the enemy forces either withdrew or failed to deliver any further fires.

Intervisibility was decided by the controller. Generally in trees, the tanks could not see the enemy, be seen, or fire. On the edges of woodlines, they had concealment but could fire and receive fire. Decisions on the terrain features were made as the specific situation arose.

Artillery fire was allowed for up to four missions of HE and two of smoke. Time to deliver various requests for fire were noted in the rules and explained to players again when they were requested.

PILOT STUDY OF INDIVIDUAL-PLAYER MODE

The primary purpose of this pilot study was to determine whether players could adapt to the two-dimensional medium and demonstrate realistic maneuvers. The secondary purpose was to determine whether the data that MPE yielded would be valuable for deriving standards for Table IX performance.

Subjects. Nine subjects, four experienced and five inexperienced, played the offensive MPE. The experienced group included three 1LT and one SFC. All of the experienced players had participated in battle run exercises as Platoon Leader or Platoon Sergeant.

The inexperienced players were members of the Armor Officer Basic (AOB) course. All had completed classwork, terrain board practical exercises, and REALTRAIN field exercises on offensive operations. Three had fired Table IX, one as Platoon Leader. Four of the inexperienced subjects had prior service but none had prior service in Armor. All of the inexperienced subjects rated themselves as among the top one-third of their AOB class in map reading skill.

All subjects volunteered for the pilot study. No effort was made to select representative samples.

Game procedures. The player was first given a verbal orientation on the rules of the game along with the purpose of the game. The emphasis during the orientation was that the player need not be too concerned with remembering the rules; they were reiterated and enforced as necessary during the play by the controller.

The player was then given the OPORD and as much time as he required to complete his planning and request his preplanned fires. (This rarely took more than 5 or 6 minutes.) The controller wrote down the preplot locations as announced by the player. The tanks were positioned in the assembly area. The player was asked to identify which tank would be his (platoon leader) and which would be his platoon sergeant's (tanks were color coded on the back deck).

Two controllers were used during the game. One of the controllers concentrated on the movement of the player and introduced and controlled the threat force. The other controller recorded the movements and actions of the player by section and where applicable, by individual tank.

The player was allowed to move his tanks at a one move per minute rate. Usually, the controller would have to prompt each move, but otherwise the controller did not interfere with a move unless the player exceeded the movement rates or threat action was introduced. When threat action was introduced in the "middle" of a move (for example, when a tank or section was emerging from a wood line approximately midway in the length of their move) the player was normally allowed to complete that move (of that section if vehicles were moving by section). The player's vehicles were then "backed up" to the point that it was decided the enemy action would take place and the threat was introduced and its actions described to the player. The player was then allowed to complete that move.

Suitability of map. After completing the MPE, each player was asked if the map medium posed any problems. No one said that it did. In fact, four players (two experienced and two inexperienced) commented that the map may be too easy compared to actual terrain since platoon leaders have no opportunity to become lost. It is important to remember that all nine players volunteered for the pilot knowing that the exercise was on a map. Subjects were probably more confident in their ability to read maps than most players would be. That confidence was probably justified.

The most important indicator of the suitability of the map as a medium for an offensive battle run was the reasonableness of the schemes of maneuver followed by the inexperienced players. As is discussed below, the maneuver techniques were fairly consistent and realistic. There is no evidence to contradict the contention that the players adapted to the medium and executed the mission as they had planned.

Despite the fact that results of the pilot argue for the suitability of the map, two reservations remain. First, a map probably cannot be a neutral medium for comparing groups with different amounts of experience. Experienced Armor officers and NCOs are likely to have much more experience with maps, both as part of operations and in map exercises, than will inexperienced soldiers. Second, although players apparently can execute their plans faithfully on a map, they may not adapt their plans to take advantage of terrain as they would on the ground. The maneuver on the map, though reasonable, may not correspond to movement on terrain.

Representative data. Although the data from the pilot were secondary to checking the feasibility of the method, the type of data MPE can yield is central to its future application. The pilot suggests that at least three aspects of an offensive operation can be studied:

- Indirect Fire planning
- Route of attack
- Overwatch techniques

Artillery played a major role in the conduct of the operation. Table G-1 shows the distribution of four classes of effective preplots for indirect fire.

TABLE G-1

Indirect Fire Preplots

	Subject	Preplot on Obj	Preplot in Front of Obj	Preplot on Enemy	Preolot within 400 Meters of Enemy
Exper.	1	1	1	1	1
	2	1	1	1	1
	3	1			1
	4	1			2
Inexper.	1	1			
	2	1			
	3	1			1
	4	1			
	5	1	1	1	2

Except for one member of the inexperienced group, types of preplots would consistently distinguish between the two groups. In the play of MPE the main benefit of planned fire on enemy locations is that it saves time--one or two moves rather than three for new targets. If casualty assessment is added, artillery will probably play a larger role. With the size of the threat, artillery support is essential to assure opportunities for movement.

Figure G-1 shows the routes that the heavy section of each experienced player followed during the MPE. Except for one player, the routes are very similar. The rationale behind the exception was that the wooded areas (through which the other players went) provided so much protection to the enemy that he wanted to avoid them altogether.

Figure G-2 shows the routes followed by the heavy sections of the inexperienced players. Comparison with the routes of the experienced players indicated consistent differences in moving to wooded areas and in traveling on trails. Although the differences between the groups appear to be consistent, one should be reluctant to conclude that the routes represent different criterion levels. It is tempting, however, to note that the experienced players, except one, appear reluctant to expose themselves to the open area east of the road.

The quality of the transcript of the play was not sufficient to allow the evaluation of specific overwatch positions. But two tendencies suggest that there are differences in the techniques of the two groups that MPE can measure. Table G-2 shows the number of turns where there was no effort at overwatch. Even assuming equally sufficient overwatch positions, the inexperienced players tended to move uncovered more often than the experienced players.

TABLE G-2

Number of Times Prior to Assault
That Both Sections Moved During the Same Turn

	Experienced			Inexperienced	
Subject	Turns	Simultaneous Moves	Subject	Turns	Simultaneous Moves
1	27	0	1	25	5
2	27	3	2	27	4
3	24	3	3	29	4
4	10	3	4	27	5
			5	20	4
Mean	22	2.25	Mean	25.6	4.4

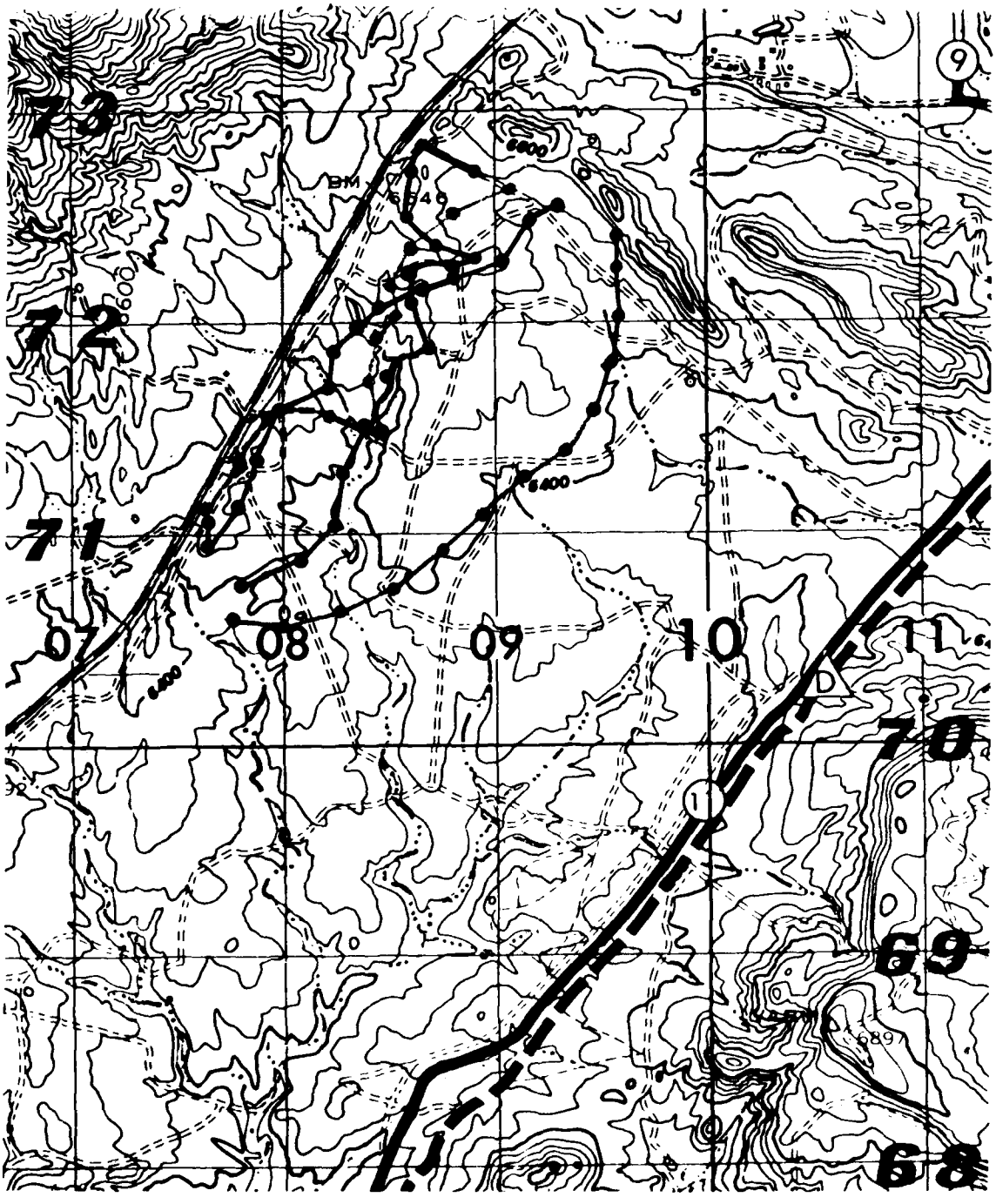

Figure G-1. Routes of heavy sections - experienced.

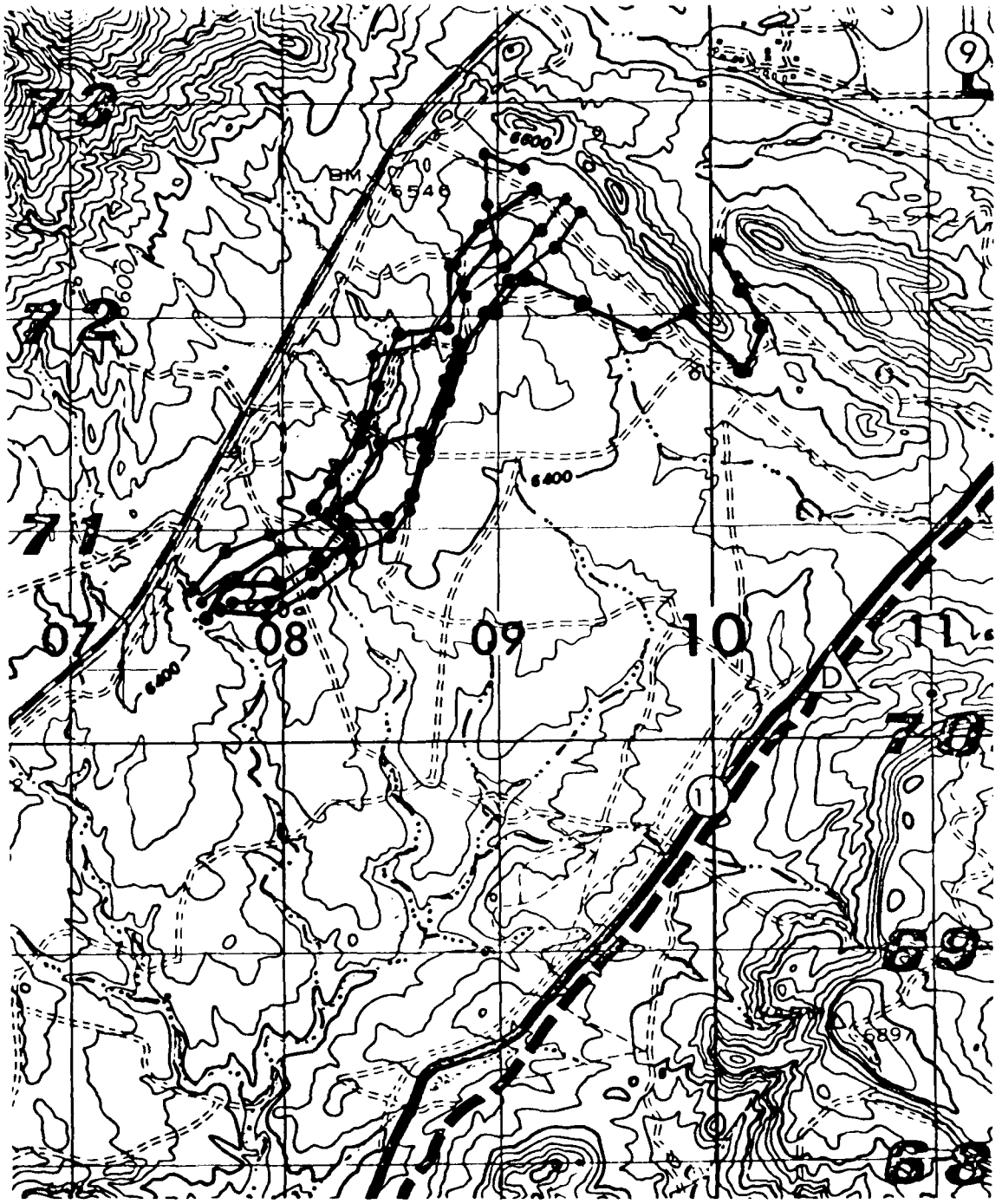

Figure G-2. Routes of heavy sections - inexperienced.

The pilot results also indicated a difference in the size of the bounds. The data in Table G-3 show that inexperienced players were more likely to take short bounds. In most cases 250 meters represented one minute's movement.

TABLE G-3

Distance of Bounds
(Treating All Bounds As Successive)

Experienced Subjects		Inexperienced Subjects			
1	700m	1	1000m	4	250
	1000		250		250
2	500	2	500		250
	700		600		600
	700	3	250		600
	500		250	5	250
3	600		500		600
	250		400		600
	700		200		250
4	250		250		250
	600		600		
				Mean	414
Mean	591				

Summary of single-player mode. Experience with the pilot study of the single-player mode of MPE is encouraging. The experienced and inexperienced players who participated were able to adapt to the map medium and conduct rational offensive operations. Further, the pilot results do not contradict the assumption that experienced PL perform better on a battle run than inexperienced PL.

Several problems remain with the format of MPE. A method of assessing casualties in light of the overwhelming enemy threat, while still allowing the evaluation of movement, is the highest priority. Another need is a technique for assessing fields of fire and concealment of specific overwatch positions. Without solving these problems the benefits of MPE for setting battle run standards are limited. But the experience with the pilot suggests that there is enough potential to justify further development.

PILOT STUDY OF DELPHI MODE

This second study was conducted as a further development of the Map-Player Exercise (MPE). The objectives of the study were to develop and test a method for using an interacting group of military experts to play MPE, thus generating terrain-specific examples of ARTEP standard level performance. The study focus included the group play technique, the direction and control of group-interaction, the development of group data collection methods, and the solicitation of military expert reaction to the purposes and techniques of the MPE-Delphi Mode.

Players and controllers. Two instructors from the U.S. Army Armor School volunteered to play the MPE during a single session lasting approximately three hours. Three project staff conducted the session and consisted of one controller and two controller-data collectors. The controller enforced the game rules, determined intervisability, and introduced the players (P) to the threat force. One controller-data collector recorded collective *P* movement and action on a move-by-move data log. The other controller-data collector operated the tape recorder and recorded *P* movement on the collective photomap game board. Both controller-data collectors employed Delphi interaction control procedures.

Procedures. Each *P* was seated at a table on which lay a copy of the large-scale photomap, the 1:50,000 scale topographic map, a specially marked copy of *Sample Platoon Battle Run Offense (Day)* (Table 4), MPE rules, data collection forms, and other task-related materials. *P*s read instructions which informed them about the purpose of the experimental session and about the general procedures to be followed. Any questions raised were answered. *P*s were then instructed to read the *Sample Platoon Battle Run* and to pay particular attention to the marked tasks and measures, *viz.*, those which might be performed and measured using the MPE simulation. *P*s were told that they could refer to the *Sample Platoon Battle Run* at any time during the ensuing session. Any questions raised were answered. *P*s then were instructed in the procedures for playing MPE-Delphi, as follows.

They were first briefed on the rules of MPE. *P*s carried out a series of practice moves on the photomap board. When *P*s had no further questions about MPE, the pilot run of MPE-Delphi was initiated.

Step 1. *P*s individually planned a maneuver scheme and indirect fire missions using the 1:50,000 scale map after receiving the OPORD. The photomap was available for simulated terrain reconnaissance. *P*s indicated the maneuver route for

the platoon, overwatch (OW) positions, likely threat positions, and indirect fire sites on the 1:50,000 scale map.

Step 2. *P*s in collective mode presented and discussed their individually developed plans, each explicating his rationale for various aspects of his plan. After about 10 minutes of discussion, Delphi controllers instructed *P*s to adopt one of the plans *in toto* or to consolidate the two plans into a collective plan.

Step 3. *P*s independently made the first move of the mission, moving five individual tanks. (Moving individual tanks was abandoned after a few moves as impractical given the scale of the map board relative to the scale of the tanks and considering the time required. Subsequently, two tanks were moved--one representing the heavy section (HS) and one representing the light section (LS).) *P*s wrote down any fire or communication taking place during a move on an individual move-by-move data log. *P*s sat at two separate stations.

Step 4. *P*s in collective mode presented, discussed, and consolidated their independent moves into a collective move. The collective move was recorded on the collective photomap board. HS and LS moves were symbolized by a square and a circle, respectively. The move number was written inside the symbol. The final position of each move was recorded; a line indicating the route taken between successive final positions was recorded on the collective photomap board.

MPE-Delphi continued with the independent move, discussion, consolidation, collective move cycle. If after *P* discussion and Delphi controller probing, consolidation or *in toto* move selection was not achieved, one of *P*'s moves was selected by chance.

Threat engagements were not introduced during the independent move step. Only when a collective move resulted in threat force intervisibility with friendly force within effective weapon range was an engagement introduced by the controller. After an engagement was introduced *P*s independently made engagement action decisions. Then, following discussion, probing, etc. a collective engagement action decision was achieved and recorded. PL commands and communications were recorded on a move-by-move data form; engagement maneuver was recorded on the collective photomap.

The Delphi controller task included the following aspects:
1) *Ensure that individual decision-making is done independently.* It is important that each *P* enters the discussion step with an independently taken decision to serve as a concretized anchor point for other *P*s to react to. Co-evaluation of decisions is facilitated when each *P* has a structured

decision to defend and other structured decisions to criticize.

2) *Cue and faciliate P interaction.* Solicit opinions from each *P*. Help balance out unequal dominance relationships among *P*s.

3) *Get the Ps to state the dimensions which they used in making their decisions.* If *P*s do not raise pertinent dimensions in free discussion, probe for the dimensions. If probing does not result in externalization of potentially relevant dimensions, then ask *P*s about the relevance of candidate dimensions.

4) *Elicit from each P his prioritization of the dimensions of the decision space; then elicit a collective prioritization.* Both 3) and 4) facilitate group movement from intuitive-based decision-making discussion to an analytic-based decision-making discussion.

5) *Terminate group discussion when the basis for decision-making is clear to Ps. Apply chance-selection-of-move decision alternative when consolidation is not achieved.* The timely application of chance selection procedures during an impasse between or among *P*s forestalls resolution by dominance and keeps *P*s on coequal terms. Interaction control measures as above are critical to the Delphi process when participants interact directly.

Delphi conduct of mission. A consolidation of independently developed plans was adopted by *P*s. The plan called for a N.E. maneuver axis from the assembly area to an assault position 1200m S.W. of the objective. From the assembly area the initial 800m was covered in traveling overwatch (OW). The remaining distance to the assault position was covered in bounding OW, with bounds of 400m or less. Wooded areas and a stream bed were used for concealment. Five TRP's were preplotted. The following moves occurred:

Moves 1-8 - Call TRP 2 on the objective. Move by sections in traveling OW N.E. 1100m to a LS OW position.

Moves 9-10 - HS bounds N.E. 400m. HS enters stream bed during bound. LS is in OW. HS takes up OW position.

Move 11 - LS engaged by 4 BMP after moving off of OW position (moving to join HS). HS from OW position maneuvers and engages BMP's with HEP and HEAT. LS maneuvers back to OW position. TRP 3 is called.

Moves 12-14 - LS moves N.E. 350m to join HS on OW position.

Moves 15-16 - LS begins a bound N.E. with HS in OW. At beginning of move 16 LS is engaged by 3 exposed T62's. From OW HS engages T62's with SABOT. LS seeks hulldown defilade. A danger-close HE indirect fire mission is called.

Moves 17-22 - The platoon moves by bounding OW to assault position. The bounds are less than 400m. HE/smoke is called on objective. The platoon waits for smoke.

Move 23 - The smoke mission comes in. The platoon begins on-line assault with PL in center. The platoon uses fire and maneuver to objective at top speed, and as violently as possible.

Discussion and conclusions. The performance of the Delphi group is characterized by:

1) simultaneous section movement only when contact is unlikely or during assault,

2) bounds of 400m or less,

3) well integrated use of artillery and smoke,

4) maximum use of available concealment and cover, and

5) use of OW continuously to assault position.

These performance characteristics seem to indicate a clear embodiment of ARTEP standard level behavior. However, several Delphi panels would have to be run to determine the performance bandwidth of standard level behavior.

Protocols of sufficient detail were not available from the runs of the nine players comprising the single-player MPE pilot study to allow comparisons with MPE Delphi performance. Several *P*s from the first pilot study seem to have selected an axis of advance similar to that chosen by the MPE Delphi panel, but section interplay data are not available and are critical to comparisons.

The results of this initial ground-breaking application of Delphi techniques to the MPE are encouraging. Play was smooth and can clearly be made smoother. *P* interaction was fruitful in explicating dimensions of the decision space pertinent to ARTEP standard level performance. There is room for improvement in Delphi control techniques. As experience is gained control can become more systematized and probing techniques more comprehensive. But a good start to build on has been made that has excellent *P* acceptability. The *P*s

were highly cooperative and enthusiastic throughout the session. Both thought that MPE-Delphi was a useful technique for generating examples of standard level behavior for the platoon battle run. Both volunteered for future MPE-Delphi sessions.

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